THE BOOK of KNOWLEDGE

THE SKIRMISH WITH THE COSSACKS

Jean Baptiste Edouard Detaille was a well-known French painter of battle scenes. He was the favorite pupil of Meissonier, and, like his master, paints his pictures with regard to the smallest detail. In this picture we see a squad of lawless-looking Cossacks tearing down a muddy roadway, with Napoleon's Imperial Guard in full pursuit. The long spears of the Cossacks are of little use in a conflict like this.

The Book *of* Knowledge

The Children's Encyclopædia

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Point reached by Sound Waves through Air
Point reached by the Sound Waves through Steel Rails
Point reached by the Sound Waves through Water

This picture shows us how far the sound waves made by the ringing of bells would travel through air, steel, and water within a given time if the bells were all struck at exactly the same moment.

THE WAVES OF SOUND

CONTINUED FROM 4504

WHEN we study light we learn that in order to have light it is necessary that there shall be not only something outside our bodies, but also an eye to see that something. All Nature is in darkness except where there are eyes to see. In the same way, "the silence that is in the starry sky" is never broken on the earth except where there are ears to hear. We are now going to study the something outside ourselves to which the ear responds. We may call that something sound, but it is not really sound until there is an ear to hear it.

Just as light is a wave motion, so is sound, and certain facts which are common to all kinds of wave motion are therefore true both of light and sound, as we shall see. But otherwise the differences between these two kinds of wave motion are very great. Anything that carries, or conducts, or conveys, we may call a *medium*, which really means the "thing in the middle." Sound, then, unlike light and radiant heat, is a wave motion in a material medium. This medium is very often air, but it may be any gas or mixture of gases; it may be such a liquid as water, or it may be a solid body.

Where there is no matter there can be no sound, for sound is not conveyed by the ether. It follows that no disturbances on the sun or the moon could ever produce a noise that we could hear, because beyond the limits of our atmosphere there is nothing but the ether between us and these heavenly bodies, and though the ether conveys light, it cannot convey sound. When we say that sound is a wave motion, or a vibration, we make a statement which anyone who has seen or felt what happens when sound is produced will agree is true. For instance, we may hold a piece of string tightly, one end in each hand, and then suddenly pull it. It will actually be seen to vibrate as it produces a little musical note.

The same is true of a piano wire; or if we touch a bell or gong that has been sounded, we can feel that it is vibrating; also we know that, in such a case as that of a tumbler which has been struck, the finger which stops the vibrations stops the sound at the same time, proving that the vibrations are the cause of the sound. Every time the string or the bell or the gong moves, it gives the air a little kick, and so there is produced a series of waves which reach our ear, and which then become sound.

It is easy to prove that the air, and not the ether, conveys these waves. We may put an electric bell

inside an air-pump and set it going, and then we may start to draw the air away by means of the pump. As we reduce the amount of air surrounding the bell, our sight of the bell is not affected, because we see it by light which travels through the ether. But, on the other hand, the sound of the bell gradually becomes fainter, until at last it ceases altogether. The bell itself is vibrating as it was before, but if there is no longer any air around it, it cannot create those waves which we call sound. Then, if the air is gradually admitted again, the sound will return. This simple experiment teaches us not only what it is that conveys sound, but also that the loudness of sound depends largely on the state of the air.

When we have opportunites of comparing the speed of light and sound, we find a great difference. We see the puff of smoke from a distant cannon many seconds before we hear the report of the explosion. Light travels so fast that, however distant the gun is, we see what happens in fractions of a thousandth part of a second. But sound travels comparatively at a very slow speed, which can easily be reckoned.

WHY SOUND TRAVELS MORE QUICKLY AT ONE TIME THAN AT ANOTHER

The speed of light and of radiant heat is always exactly the same in any circumstances, so far as we can discover. This, however, is not at all true of sound, the speed of which varies considerably with different circumstances.

We may notice at once that, fortunately for the art of music, the speed of sound varies only in very small degree with its pitch or with its loudness. It would be a very serious matter for the hearing of music if, when we were listening to an orchestra, the sound of the flutes reached our ears a beat or two before the sound of the double basses, which the composer meant us to hear together; or if a tune, being loudly played by one part of the orchestra, and softly accompanied by another part of it, reached our ears before or after the accompaniment.

The ordinary speed of sound through air is about 1,100 feet per second. As the temperature of the air rises, it becomes slightly more elastic; it rebounds better when struck, so to speak, and therefore the passage of sound through it—which entirely depends upon the elasticity of the air—is made easier. The speed of sound, therefore, increases somewhat with a rise in temperature of the air, so long as the air is of the same density. If we understand this principle of elasticity, we shall see why it is that sound passes more rapidly through liquids than through gases, such as the air, and still more rapidly through solids.

WHY A NOISE WILL TRAVEL FASTER THROUGH IRON THAN THROUGH AIR

Such a metal as iron, in the solid state, has much greater elasticity than air, and sound will travel through it about seventeen times as fast as through air. This means that waves of the same shape which pass through air, pass in and through the solid iron. Now, it is possible to make a confusion here about speed, and therefore we must just explain —though we have not really come to that yet—that the pitch of a musical note depends upon the number of waves which strike the ear in a second. This is quite a distinct question from the rate at which the waves travel through the air or anything else.

A given sound conveyed through iron will reach the ear seventeen times more quickly than when conveyed through air, but its pitch will be just the same in both cases, because the number of vibrations occurring in each second is the same in both cases, though they travel through the iron so much more quickly.

When we come to study the loudness of sound, we find that the first law about it is the same as the law of other wave motions, such as radiant heat or light. This law is true also of other things which are not wave motions, so far as we know, such as gravitation.

WHY WE HEAR WELL ON A CLEAR FROSTY NIGHT

In the exact language of science, the law is that "the loudness of sound varies inversely as the square of the distance." This is simply a neat and quick way of saying that if we walk three times as far away from the source of the sound as we were before, its loudness will be not one-third of what it was, but one-ninth of what it was, nine being the square of three. The square of a number is the number multiplied by itself.

That is all there is to say about the power of such things as light and gravitation; but in the case of sound other

things come in, for the density of the medium which conveys it is very important. On a frosty night the air is very dense. One consequence of this is that a motor-car runs better, because the engine gets a better supply of oxygen. Another consequence is that sounds are heard more loudly. On the other hand, the report of a gun high up among the mountains, where the air is rare, is like the sound of a Christmas cracker going off, a fact which reminds us at once of our experiment with the bell and the air-pump.

At the seaside, when we watch the waves rolling up against a breakwater or a cliff, we know that they may be reflected, or bounced back. Often the waves may be broken up, and what exactly happens will depend on the kind of surface against which they strike. But if it is a smooth, flat surface, we see that the waves are reflected from it, almost as a ball is from a wall. Now, if sound is really a wave motion, and if calling it that is more than merely making a sort of picture of it in our minds, we should expect that it could be reflected, just as the waves of the sea may be; and this is indeed the fact.

THE WAY IN WHICH SOUND WAVES ARE BEATEN BACK FROM A WALL

All wave motions can be reflected. What is true of sound is as true of radiant heat and of light as it is of the waves of the sea. There are certain laws which apply to these very different cases. The first of these laws, when stated in scientific language, is that "the angle of incidence and the angle of reflection are equal." This means that the angle at which the wave approaches the surface is the same as the angle at which it will leave the surface.

The same applies to a billiard-ball striking the cushion of a billiard-table, or it applies to the most ordinary case of throwing a ball against a wall. If we throw the ball straight at the wall, it comes back straight; if we throw it slantwise, it comes off the wall slantwise; and if the wall is flat and the ball has no spin on it, and if we could measure the angle at which the ball approaches the wall and the angle at which it leaves, we should find them the same.

This is equally true of sound and radiant heat and light. One of the points to notice is that the level, or plane, as we say, in which the wave approaches the surface that reflects it, is the same as that in which it comes off. For instance, suppose the sound were running along on the level of this paper, and then struck obliquely, or slantingwise, a wall at the edge of the paper; it would come back not only at the same angle as that at which it approached the wall, but also it would come back still traveling on the level of the paper—not bent upwards or downwards so as to travel either above or below it.

HOW THUNDER FROM THE CLOUDS IS THROWN BACK BY THE EARTH

This is true also of light and radiant heat. We all know that sounds seem different in the open air when compared with sounds in a closed room; we know how different our voices sound in different places. All this is a question of the reflection of sound. But the most striking way in which we can prove to ourselves that sound is reflected is in hearing an echo.

One of the ways, indeed, in which we can test for ourselves the rate at which sound moves is to make a sound at a certain distance from an echoing surface, and then notice how long it takes for the echo to reach our ears. There are echoes in Nature besides those which we make ourselves, and the best instance of reflection of sound causing an echo is a peal of thunder.

Thunder is a disturbance in the air forming a sound, made by the passage of lightning from cloud to cloud, or from cloud to earth. If there is no echo, we simply hear a single clap of thunder, corresponding to the single instantaneous cause of it. When we hear a peal, we simply hear that clap echoed again and again from cloud and earth.

THE ECHO OF MUSIC ON THE WALLS OF A GREAT HALL

In places made for speaking or for music, echoes are often a very great nuisance. All our success in listening to a speaker, and all our pleasure in listening to music, depend upon the absence of any echoes that can be noticed. In one of the most famous halls in London, for instance, it is almost impossible to hear music with pleasure, because of the echoes from the smooth surface of its circular wall.

Thus, when a player strikes a single chord upon a piano, it sounds in almost

every part of the hall like a quickly repeated chord. This interferes not only with the hearing, but also with the production of music in such a place. Even at the best, everything is more or less blurred, as it is when an unskilful player plays on the piano, and keeps the loud pedal on all the time.

THINGS THAT MUST BE REMEMBERED AT GREAT MEETINGS AND CONCERTS

The case is still worse in listening to a speaker, because everything depends upon our hearing each syllable, apart from any echoes of words previously spoken. Therefore, many devices have to be adopted in order to prevent, as far as possible, the reflection of sound in such cases. Tapestries and hangings, and so forth, are bad reflectors of sound, and may be of service; wires stretched across the hall above the heads of the audience may often help to break up the sound waves, so that they are, at any rate, not reflected from the roof.

The people themselves, by their mere presence, improve the properties of a hall for speaking and singing, because their bodies form a broken surface for the floor of the hall, and the sound waves are broken up, just as the waves of the sea are broken up when they strike an irregular cliff as compared with a flat breakwater.

Recent careful study in France has shown the way in which a hall ought to be built so that the reflection of sound may be useful rather than the reverse. When the surfaces are far away from the speaker or the musician, as the Carnegie Hall, New York, time is taken in the reflection and so a distinct echo is heard. But if the sound is produced quite close to a curved surface, as in the case of many churches, then the echo, or reflection, occurs so quickly that, instead of being heard by the ear as an echo interfering with everything, it blends with the sound of which it is an echo, and simply makes it clearer.

TWO MEN WHO TALKED TO EACH OTHER WHEN A MILE APART

There are other ways in which the principle of echoes can be turned to good account. Thus it is recorded that two Arctic explorers talked to each other at a distance of over a mile, their voices being beautifully reflected from the smooth sheet of ice between them. The celebrated Whispering Gallery of the Capitol, at Washington, is really an illustration of the very same thing. Lastly, the principle of echoes, or the reflection of sound, is invaluable in every case where we employ anything of the nature of a trumpet. The use of the outer ears of animals depends upon the reflection of sound, as do the artificial ear-trumpets made for deaf people. Sound is reflected from side to side of the ear or the ear-trumpet until it reaches the place where it is desired to be heard.

The echoing, or reflection, of sound applies equally where the trumpet is used, not in catching the sound, but in making it, as, for instance, in the speaking-trumpet used at sea, or the speaking trumpet—for it is exactly the same thing—which is put opposite the sounding part of an old-fashioned phonograph or gramophone.

We know that light may not only be reflected, but also bent, or, as we say, *refracted*. That is what happens when we concentrate the light of the sun by means of a burning-glass on a piece of paper; and it also happens in many other cases. Now, it is very interesting to discover that sound can be refracted, or bent, in its course, just as light can. The refraction of light is extremely important, and we shall have to study it carefully; the refraction of sound is of no practical importance, but it is interesting because it teaches us about wave motion.

AN EXPERIMENT WITH A SWINGING BALLOON AND A WATCH

If we take a big bag or balloon, and fill it with carbon dioxide, we find that this bag acts towards sound just as a lens acts towards light. The sound waves will be bent by the gas in the balloon, and they will be brought to a focus on the other side of the balloon, just as sunlight may be brought to a focus on a piece of paper by means of a burning-glass.

Thus, as in a well-known experiment made by Lord Rayleigh, one of the greatest students of sound, we may stand opposite a watch at such a distance that we can hear nothing. But if a balloon filled with carbon dioxide is made to swing slowly from side to side between us and the watch, and if we are just at the right distance, then, whenever the balloon is in the middle of its swing, and focuses the sound waves, we shall hear the watch ticking.

THE NEXT PART OF THIS IS ON PAGE 4869.

WHAT MAKES AN ARROW FLY?

CONTINUED FROM 4488

THE motion of the arrow through the air is a kind of power, and that, like all other power, has to come from somewhere. It was not in the arrow when it lay in the quiver, nor even when it was put in the bow; but when the cord was released and pushed the arrow, the arrow got its power of motion.

The power, then, came from the stretching of the bow; for if the bow were not stretched it would not drive the arrow; and so, if we trace the power backwards, we find it came from the strong muscles of the archer who bent the bow. But the question for us is: What happens in the bow when it is stretched? All we can say is that when the cord and the bow are bent out of their natural shape by being stretched, they somehow carry in themselves, ready to act, the power they have got from the muscles which stretched them.

The same applies to many other cases where there is hidden power. If we carry a stone from the bottom of a cliff to the top, there is even less difference in its appearance than there is when a bow is stretched; yet it is different, for it has the power we put into it when we carried it, and if it drops from the cliff on our head, as we walk below, we shall be sure that that power is something real.

DOES A ROCK BREATHE?

At first sight, this seems to be rather an absurd question, because we always associate breathing with living creatures, and rocks are certainly not alive in the ordinary sense of the word. It really rather depends on what we mean by the word breathe. Rocks have no lungs; they do not take in oxygen and give out carbon dioxide as we do; but if by breathe we simply mean take in oxygen, then the answer to the question is Yes.

Long ages ago, the rocks took in huge amounts of oxygen when they were being formed. It is reckoned that there is enough oxygen contained in a layer of rocks a few feet deep to equal the amount of oxygen in the air above them.

This process of the in-take of oxygen from the air by rocks still goes on in some degree, and it helps in part to explain why many kinds of rocks crumble and break down and wear away from year to year, especially when we take the wearing action of rain and wind into account as well.

WHAT MAKES THE SEA ROAR?

Roaring is a kind of sound, and though sound is a something that can travel in all kinds of matter, it is usually, as we know it, a wave in the air, because, as a rule, our ears are not pressed up against any solid thing, nor are they under water, and so all sounds that reach them must reach them through the air. This is

true when we hear the sea roaring, though a swimmer, when he goes head first through a wave, may hear a roaring coming through the water when he is below the surface. Everywhere the surface of the water is in contact with the air, and if the water moves at all violently it may start in the air those kinds of waves which our ears can hear and which we call sound. These waves are of the kind that are not very numerous in each second, and so they make sounds of low pitch which we call roaring. Sometimes, when a wave breaks, a great volume of water may fall upon the rest of the water, and so make a sound which is more like an explosion than a roar.

Tennyson wrote once about what he called "the scream of the maddened beach"; and it is very interesting to notice that we do hear on the beach sounds which are much more like a scream than a roar, though the sea itself never screams. It is the beach, and not the water directly, that makes the scream, and the kind of scream will depend on the kind of beach. Soft sand will not scream, but where there are pebbles of certain kinds, as the waves move up and down they rub the pebbles against each other, and that produces air-waves of a quicker rate, which may be likened to a scream.

WHY DOES WATER SWELL WHEN IT IS HEATED?

It is not true that in all cases water swells when it is heated, because if we take water at the freezing temperature, and then slowly heat it, we find that, instead of swelling, it shrinks until it reaches the point which is called 4 degrees on the centigrade scale of temperature about which we read on page 1937. That, however, is a special exception, and it is perfectly true that if we go on heating the water after 4 degrees centigrade, it does swell. This is true not only of water, but also of almost anything, whether a solid or a liquid or a gas.

We can find some kind of explanation for this if we think of heat as a to-and-fro motion of the tiny parts of which all matter is made. The hotter the thing, we suppose, the wider is this to-and-fro motion of its tiny atoms.

Suppose we have a crowd of children, and all the to-and-fro motion each of them makes is just so much as is required for breathing. Fifty such children could be packed together into a very small space; but if, instead of making only this little movement, each of them wanted all the time to be making little runs of five yards backwards and forwards, we should plainly not be able to pack these fifty children into as small a space as before, and the bigger the run that each of them wanted, the more space they would require to take up.

If, instead of children, we think of the atoms of matter, and if we think of heat as these atoms of matter running to and fro, we shall see why water and other things swell when they are heated. No one knows what special arrangements are made in the case of water between 0 degree and 4 degrees centigrade.

WHY DOES SHALLOW WATER FREEZE FIRST?

When the air is very cold, it gradually takes heat away from the water which is exposed to it, and so that water becomes colder. The earth beneath the water is much warmer, as a rule, than the freezing air, and so we expect to find the coldest water at the top, where the heat is being lost, and the warmer water below.

When water is cooled from 4 degrees centigrade down to the freezing-point, it does not become heavier, and so sink, as we should expect; if it did, a pond would freeze from the bottom upwards. On the contrary, it grows lighter and floats, and so a pond freezes at the surface. But, short of cooling the water down so near to the freezing-point as 4 degrees centigrade, the water is, of course, becoming heavier all the time it is cooling, and, being heavier, it must sink, while the warmer water takes its place at the top.

This means that the whole thickness of the water must be cooled down before any of it will freeze, and therefore the shallower the water is, the quicker it will freeze. The little puddle in the road freezes quickly, but the deep pool will not begin to freeze until the whole depth of its water has been cooled.

WHY DOES THE SEA NOT FREEZE?

Sea-water, like any other kind of water, can freeze, and it does freeze if the conditions are right; but there are some good reasons why the sea does not freeze nearly so easily as a pond or lake, or even a river. It is not the salt in sea-water that makes the difference so much as the

depth and constant motion of sea-water. Until the whole depth of a quantity of water has been cooled down it cannot begin to freeze, for, until it has all cooled, the warmer water, being lighter, must always come to the top. Therefore, when water is very deep, it is very difficult to freeze, and thus the great depth of the sea, in many places amounting to several miles, is one of the chief reasons against its freezing.

But the sea is also in constant movement under the influence of tides and winds and currents. The motion of water interferes very much with its freezing, though it does not interfere nearly so much as the depth.

But in the coldest parts of the earth's surface the sea does freeze, as we find in the records of those explorers, like Peary, Amundsen, Scott, or Shackelton and others who made Polar explorations. The same seems to be the case on our near and wonderful neighbor, the planet Mars, for we can see through our telescopes the ice or snow-caps at each of its Poles, like the ice at our own.

ARE THE CLOUDS PART OF THE EARTH, AND DO THEY GO ROUND WITH IT?

Certainly the clouds are part of the earth. We use the word earth in two senses—sometimes to mean the great ball on which we live, and sometimes to mean the soil—and these senses confuse us, so that sometimes we forget that we do not really live on the outside of the earth at all, but only at the bottom of its outside layer, which we call the air or the atmosphere.

That outside layer, and all it contains, such as the clouds, is as much part of the earth as the mountains or the oceans are. It is true that, from our particular point of view, we may think of the air as something laid on outside us to serve as a parasol by day to shield us from the heat, and a blanket by night to shelter us from cold, as it does; but then our point of view only depends on where we happen to be, and we must not go by that.

The clouds, being part of the earth, go round with it, as does the atmosphere in which the clouds hang. No doubt it is true that, as the earth spins, the air tends to drag behind; and high clouds will do this also. But, in general, the air and the clouds certainly spin round with the earth. If this were not so, there would be a gale so tremendous that we could not live at all, nor could one stone lie on top of another.

WHY IS RUNNING WATER PURER THAN STAGNANT WATER?

Though we think of water as a thing which does not do much, yet, in point of fact, it is always doing things. It is the great supporter of life, in the first place. Also, it is the great dissolver of gases and of solids from the air above it, and from the ground beneath it, and these gases and solids help to support life. So stagnant water very quickly becomes filled with living creatures and with the products of their lives. We call it impure just because that does not happen to be the kind of water that we prefer to drink. But really, though we give it a bad name, it is doing the great work of water on the earth.

Even the water we call pure contains a great number of other things in it besides water, and that is especially true of running water, which is rich in gases. It is probably not very long since running water existed in the form of rain, which is much the purest of all the natural forms of water, although it also contains a certain amount of dust, and always a certain quantity of the gases in the air dissolved in it.

It is the gases in running water that make it so nice to taste, and this really makes more difference than we think. The Chinese long ago said that the proper way to make tea was with water taken from a running stream. If we compared such tea with tea made from pure distilled water, we should think the latter was a very poor drink indeed.

WHY DOES A CRUST FORM ON HEATED MILK THAT IS LEFT STANDING?

The crust that forms on milk which has been heated is a definite and very valuable chemical substance. It is a proteid, or albumin, and is called lact-albumin, from the Latin word for milk. It has the property of turning solid, or clotting, when it is boiled, and then it floats on the top of the milk, and forms the crust which so many people dislike and throw away. Lact-albumin is not the only protein of milk, nor the most abundant, but it has special advantages.

The life of many a baby that cannot digest the other protein of milk is saved by the use of this lact-albumin. When milk has rennet added to it, forming what we call curds and whey, the other

protein of the milk is clotted and helps to form the curd; but in this case the lact-albumin is not clotted, and remains liquid in the whey. That is why it is sometimes called whey-albumin. Babies and invalids who are unable to digest any other kind of protein—and without some protein no one can live—can almost always digest whey and its albumin. Therefore, to throw away the skin that forms on heated milk is simply a wilful waste of one of the best things in the milk.

Not only children, but also many grown-up people feel very strongly on this subject, though the "skin" has no taste. But certainly we ought to do our best to persuade children to take the skin, though the best way of all is to have pure milk, which does not need to be heated. That will be the case some day, but it is not yet; and, meanwhile, most milk should be heated to a very high temperature, even if the "skin" is wasted.

WHY DOES THE SUN MAKE CARPETS FADE AND NOT FLOWERS?

The color of carpets is due to the presence of special chemicals that have the color which is desired. It is as if we took a handkerchief and soaked it in ink, and then allowed it to dry. The chemical substances that are dissolved in the ink give the handkerchief its color. Now, the sun has in itself the power of altering the dyes in a carpet or a curtain, and if it alters them enough the color of the thing changes.

But there are dyes which are fast, as we call them. This simply means that the sun does not do anything to them, and the beautiful dyes which plants use to color their flowers are all fast dyes; at any rate, they do not fade while the flower is alive.

IS THE EARTH GROWING SMALLER?

The answer to this question is Yes, but we must understand what we mean by smaller; we mean actually smaller, and not less heavy, for that is another question. The earth might become smaller by shrinking without losing any of the stuff which makes it, or it might become smaller because part of the material of which it is made has been lost. It might shrink smaller, or it might wear smaller, so to speak.

We are certain that the earth is shrinking smaller, because we know that it is slowly losing heat and growing colder, and if it does this it is bound to shrink. We suppose that the great cause of earthquakes is the shrinking of the inside of the earth as it cools, so that the crust on which we live is left not sufficiently supported.

As regards the possibility that the earth is wearing smaller, we cannot doubt that it does slowly lose a certain amount of the gases of the atmosphere by a sort of leakage from the outside layers. But, on the other hand, certain things reach the earth and add to its amount from outside space; and, for all we know, the earth may be actually gaining more in this way than it loses in the other way.

It has been known for many years that the earth lives in a more or less constant shower of meteors, and these become part of the earth when they reach it. That is true whether they reach the solid earth or whether they are burned up completely in the air. Also, we now believe that the sun is always shooting out tiny particles of atoms, called electrons, in all directions, and our earth catches a very great number of these.

ARE PICTURES OF THE THINGS WE SEE PRINTED ON THE EYES?

The word photograph means a light-picture, and that is exactly what photographs are—pictures printed by the light on a film or a plate. This film or plate is covered with certain chemical substances which are affected by light, according to its power and the place where it strikes. The back part of the eye is in these respects the same as the photographic plate. It also contains chemical substances which are changed by light. They are not the same substances as are used on any photographic plate or film, but the principle is exactly the same. Therefore it is perfectly true that pictures of what we see, such as a house or a landscape, are printed on the eye.

But there is a tremendous difference between the retina of the eye and the plate of a camera. If the picture printed on the eye stayed for any length of time, of course we could not see anything moving. If we went to a moving-picture exhibition, where many pictures in succession passed in front of the eye in each second, we should get a blurred picture in just the same way as if we

took a picture of what the biograph shows on a single photographic plate. If our eyes are to be useful, it is absolutely necessary that the pictures printed upon them should be no sooner made than they fade completely away, and leave the plate, so to speak, ready for another picture. This is where the wonder comes in—that it should be possible, in a tiny fraction of a second, for the back of the eye continually to remake, from the materials supplied it by the blood, the chemical substances which light affects when we see.

WHEN A STONE IS THROWN UP, WHAT KEEPS IT IN THE AIR BEFORE IT DROPS?

It would be more reasonable to ask: Why does the stone ever return? We shall understand the case by seeing what actually happens when the stone is thrown, and we must be careful to hold hard by Newton's first law of motion, which says that a moving thing must go on moving in the same straight line at the same speed for ever, unless something stops it. When the stone is thrown, motion or power is put into it, and Newton's law—the law that all power has to be accounted for—teaches us not to wonder what keeps the stone up in the air, but to expect that it will go on moving until it leaves the earth altogether.

Two causes, one much more powerful than the other, bring it back. One is the resistance of the air, which the stone pushes against as it rises, and which thus has some of the motion of the stone drained away into itself. The other is the earth's gravitation, against which the force in the stone has to fight until it is exhausted. Then the stone returns, but the power that was in it has not gone, as we soon discover if it happens to fall upon our head.

WHEN WE FEEL COLD, IS OUR BLOOD COLD?

Our feelings of cold or heat come, as a rule, from the very surface of our bodies. What we judge by is what happens to the skin. If the skin is losing heat quickly, we say we feel cold, and if it is losing heat very slowly, or actually gaining heat, we say we feel hot. The blood is the most important thing which decides how the skin feels, as a rule; but, of course, in special cases the skin is more affected from outside than from inside, as when we are in a cold draught or exposed to a fire. When we feel cold, our blood is not cold. It is as warm as usual. Only very little of it, however, is passing through the skin, and that is why the skin feels cold. Perhaps we are in cold surroundings, and the body is keeping most of the blood to warm the great organs like the brain and the heart, and the skin, which does not matter at all compared with them, has to go short.

In certain illnesses the case is very striking. In malaria, for instance, there is usually a shivering stage, when the person feels very cold. His skin also is pale, and there is very little blood in it, and that is why he feels cold. But if we take the pains to find out in some way the actual temperature of his blood, we shall find that it is much hotter than it ought to be.

The person is, indeed, in the first stage of a fever. In the second stage this hot blood will flood the blood-vessels of the skin, and the quantity of it and the heat in it will make the person feel as hot as he previously felt cold.

WHY DOES THE SUN SHINE DURING SHOWERS OF RAIN?

"Why should it not?" said the Wise Man. The sun we know is shining, whether we can see it or not, by night and by day. If we do not see it, that is because something is in the way, such as the clouds that rain comes from. If these clouds cover the whole sky, we cannot see the sun, but if they do not, the sun may shine between them.

DOES A HEN KNOW THAT CHICKENS WILL COME OUT OF HER EGGS?

One of the greatest of facts in the animal world is what is called instinct, and the mighty difference between our minds and those of the lower animals is that in us instinct has become largely changed into a much more wonderful thing which we call intelligence. One of the most important facts about an instinct is that the animal goes through the action without knowing what its purpose is and what will come of it. If an animal could foresee the consequences of its acts, then it would be a reasoning and intelligent being, worthy to rank beside ourselves.

This is true of all instincts, that the action is done because something within the creature impels it to perform that

action, but with no knowledge of its use and purpose. Thus, when a baby instinctively sucks a bottle it does not know that the object of doing so is to supply itself with material and power for its life.

It may possibly be that in some cases an animal of the highest type, such as a dog or a horse, may notice, after a number of times, that certain consequences follow upon its instinctive actions, and so it may learn what will happen, just as we do after a time when we exercise our instincts.

But it is very unlikely that the hen, whether it be the first time or the twentieth time that she sits, has any idea except simply that things like eggs are very good to sit on. This is true, even though she is glad to see the fluffy little chickens when they come.

WHERE DOES ALL THE BAD AIR GO?

The answer to this question can teach us a great lesson about the meaning of words like good and bad. It is probably wisest and most reverent for us to believe that in the long run and in their right places all things are good. That, at any rate, is certainly very true of what we call bad air. By bad air we usually mean carbon dioxide, which has come from our lungs or from a fire or a lamp, or from the breathing of animals.

We may rightly call such air bad in a sense, because it is bad for us; if there is too much of it in the air any animal is given to breathe, the animal will die. But this carbon dioxide is moved about by the wind and also by the movement which is natural to its own particles, and so it is quickly distributed very evenly throughout the air. It is very remarkable indeed to find how similar and constant within small limits is the proportion of carbon dioxide in the air, wherever and whenever we have the means to examine it.

This gas is of the utmost importance for our lives, even though we rightly call it bad when it is in the wrong place and in the wrong quantity. Without carbon dioxide all the green trees and plants would soon die of starvation; then all the animals that live on plants would die; then all the animals that eat vegetarian animals would die; and, lastly, when everything else had died, we should die ourselves.

WHY DOES THE WIND BLOW MORE ON THE TOP OF A HILL THAN BELOW?

It is quite true that the wind blows more on the hills than below them, and travelers have reported that when they go to very great heights the wind becomes still more powerful. Where mountaineers have ascended as high as twenty thousand feet or more above the level of the sea, they usually find a tremendous wind blowing; and when the mountain is ascended on different occasions, this wind is always found to be blowing, and blowing in the same direction.

People who have gone up great heights in balloons or aeroplanes have not noticed the same gale around them as mountaineers have; but that is because the aeroplane or balloon moves with the wind, and so the wind is not noticed, especially if it is steady, and the balloonist at that height cannot always make out whether he is moving or not.

The explanation of all this seems to be that, as the earth moves, and different parts of it become heated in succession by the sun, and also owing to the movement itself, the air at a considerable distance above our heads is constantly moving and forming great winds. Lower down these winds are largely wiped out by the obstacles which the moving air meets on the surface of the earth, and also to some slight extent by friction of the air with the earth, which keeps the air moving in the same direction.

HOW CAN MEN FIND OUT WHERE A FAULT IS IN THE ATLANTIC CABLE?

We must imagine that, instead of an electric cable having a copper wire in the middle, we have a long tube, into which we pour water. We must imagine, also, that the end, or bottom, of the tube is hundreds of miles away, much farther than we can see. Even then we can tell how far off the bottom of the tube is if we know how much water we have to pour into it to fill it.

Just in this way clever men have found out how to tell the length of copper wire in an electric cable. They have instruments by which they can tell how much electricity has been put into a wire when it is full, and as they know how much electricity one mile or one yard of wire will hold, they can tell how far off is the end of the wire—that is, the place where it has broken.

THE NEXT QUESTIONS ARE ON PAGE 4689.

This picture of a group of Dutch merchants, called "The Syndics," some consider Rembrandt's greatest work. These traders seem quite real, and their characters are wonderfully depicted.

A TALK ABOUT PICTURES

CONTINUED FROM 4518

DRAWING is a very, very old art; it is a way of telling other people what the artist has seen or imagined. Before we can understand a book we have to learn to read; but drawing is a language that everyone, even quite small children, can read. Even as far back as the time when men and women lived in caves and wore skins of animals for clothes, they drew rough pictures on reindeer bones.

Then someone found out how to mix colors, very roughly, and these primitive artists tried to draw with colors, so as to give an idea of what they thought was the color of things.

Slowly, very slowly, men began to notice that painting could do more than this; they began to find that colors used in a certain way not only gave a picture of the thing seen, but gave it in some curious way, as music gives sound to the ear.

In the days of ancient Greece, and when Alexander the Great conquered the world, this art had reached wonderful perfection; but although we know from ancient books the names of many of the famous Greek painters, among whom Apelles, Zeuxis, and Parrhasius were the best, their works have perished. Only a remote idea of their mode of painting can be gained from the wall-paintings found at Herculaneum and Pompeii, which were executed by inferior Greek artists when the world-power had passed to the Roman Empire. We must remember, however, that probably Greek painters knew little or nothing about perspective.

In these long-distant days of ancient Greece and Rome, art, both in painting and sculpture, served so much for the glorification of heathen divinities in beautiful human shape that, when Christianity spread and gradually took hold of the people, it came to be considered almost sinful to represent the human body undraped; so that by-and-by the painters lost their skill in painting human beings just as they were, and drew and painted figures that looked more like dressed wooden dolls.

Later, the brush gave way to mosaic work—that is, the piecing together of little bits of colored glass or stone to form pictures. This form of art spread over the Western world from Byzantium, the capital of the Eastern Roman Empire, and is known as the Byzantine style.

For centuries artists continued to work in this manner, until, in the second half of the thirteenth century, in Italy, artists began to look at men and animals and all things in Nature, and to study their form

instead of merely imitating the stiff images of the earlier men. It was then that "modern" painting began, and the first great artist who tried to paint things as he saw them was a Florentine, called Cimabue, of whom we read on page 2788.

CIMABUE, WHO MADE A SHEPHERD BOY FAMOUS ALL OVER THE WORLD

Unfortunately, we are not quite sure whether any of the old pictures that have been preserved—mostly crucifixes and representations of the Virgin and the Infant Saviour—are from his hand. But we do know that he taught a very great master, who filled the walls of many Italian churches with his scriptural fresco paintings. Fresco is Italian for "fresh," and is applied to pictures done on a fresh, wet plaster ground.

This master's name was Giotto, and he was a humble shepherd youth. It is said that while out walking one day, Cimabue found him looking after his father's sheep and drawing one of the sheep on a stone. He was so struck with the boy's drawing that he took him away to his studio, and arranged with the lad's father to make an artist of him. "The Funeral of St. Francis" is a good example of Giotto's work.

Giotto died about ten years after Edward III. ascended the English throne. For quite a hundred years Italian painters continued to fill the churches of their country with pictures that resembled those of Giotto, but were not quite so good, simply because an imitation that does not introduce anything new is never as good as the original.

In the first year of the fifteenth century there was born in Florence another very great painter, who was called Masaccio, but whose proper name was Tommaso Guidi. He lived only twenty-seven years, but during this short life he raised the art of painting to a point which it had never reached before. There is no trace of stiffness or awkwardness in his figures, which have the grace and beauty of dignified human beings.

LEONARDO DA VINCI, THE PAINTER WHO TRIED TO FLY

The next generation of painters learned much of their art from Masaccio's frescoes in one of the Florentine churches, until, with Leonardo da Vinci, Raphael, and Michael Angelo, they achieved perfection. Leonardo, at the age of about eighteen, went to learn painting in the studio of Verrocchio, where he met other pupils who, like himself, afterwards became famous. These fellow-students were Botticelli and Perugino.

Leonardo very soon became a greater artist than his famous master. He was not only a painter, but a sculptor, a very learned man, a musician, an architect, an engineer, a mathematician; and he tried to invent a flying machine. But he lives in the world today, hundreds of years after his death, by his pictures. There is a very famous picture by him in the National Gallery, called "The Virgin of the Rocks"; but perhaps the best known is in the Louvre in Paris, and represents a smiling young woman called "Mona Lisa." Leonardo died in 1519, just a year before Raphael, who also made a name that is immortal. Raphael was only thirty-seven when he died, but in his short life he painted a large number of wonderfully fine pictures, which were original and faultlessly executed. It is for this reason that he has always been held up as a model for students, and people are willing to pay very high prices indeed for his pictures painted so long ago.

RAPHAEL, MICHAEL ANGELO, AND TITIAN, ITALY'S THREE IMMORTALS

In the Metropolitan Museum, in New York, may be seen Raphael's picture called "The Colonna Madonna," which was painted to hang over an altar. This famous picture was painted by Raphael when he was only twenty-two. It was presented to the museum by J. Pierpont Morgan.

Raphael was renowned for his paintings of Madonnas and of Christ when He was a baby. The Madonna, which is "My Lady," or "Our lady" in Italian, was Christ's mother.

But there had been born, eight years before Raphael, an even greater artist, one of the greatest men who ever lived, called Michael Angelo. He was a famous sculptor as well as one of the world's painters. No artist ever wielded his brush with such marvelous power, nor did any painter ever execute, single-handed, so gigantic a work as the ceiling of the Sistine Chapel in the Vatican in Rome, where the Popes live. But it was in Venice, in Spain, and in Holland that the greatest masters of color were to work. In Florence the

painters had thought out their pictures as beautiful patterns of line-drawings, to which they afterwards added color in rather flat masses. The Venetians paid attention to color from the beginning, and studied the color appearance of things in Nature, and observed the effect of distance and different conditions of light. Their greatest master was Titian, who painted "The Garden of the Loves," which shows all his rich hues and the pleasure he took in the beautiful things of this world. He was also a very great portrait painter.

About the time that Leonardo and Raphael died, a young German painter named Hans Holbein began to make a name in Basle where he lived. Afterward he went to England, and painted many portraits which have taught us a great deal about the people who lived in those days. He died in London in 1543.

VELASQUEZ, THE SPANIARD, AND VAN DYCK, WHO PAINTED CHARLES STUART

One of the greatest masters of all time, named Velasquez, was born in 1599, at Seville, in Spain. His portraits are amongst the finest in the world. His picture of "Las Meniñas," the Maids of Honor, is really a number of portraits; we see the daughter of King Philip IV. of Spain—she is only five years old—dressed like a grown-up queen, with her little maids of honor, and in the mirror are reflected the king and queen, while Velasquez himself stands at his easel.

On the borders of Holland, too, another great painter had arisen, called Rubens, famous for his rich colors, which he had learned from the Venetian Titian. His most celebrated pupil was Van Dyck, who died the year after Rubens. Van Dyck lived in England for a long time as painter to King Charles I., by whom he was knighted. It was probably the example of Van Dyck that led to the birth of the English school of painting. One of the most charming of his pictures which have been brought over the ocean is a portrait, in the Metropolitan Museum, of the Earl of Arundel standing with his arm around the shoulders of his little boy.

REMBRANDT, WHO PAINTED THE PICTURES WITH THE GOLDEN LIGHT

At the same time that Velasquez and Rubens and Van Dyck were painting, there was living in Holland another of the great painters of all time, called Rembrandt, the golden painter, who made everything appear to melt from golden light into dark brown shadows. There are many pictures by him in the Metropolitan Museum, and among them, one of the finest of all, is a portrait of "A Man," wearing a large black hat, with a frill round his neck.

Older than Rembrandt, and living through his lifetime, was Franz Hals, a Fleming, who lived and worked in Holland. He was the greatest character portrait painter in the world. He was fond of a merry life and laughter, and he loved to paint jolly people, like "The Laughing Cavalier," so often reproduced.

Then in France there had grown up a number of artists, of whom Watteau is the most famous. He and his many imitators and followers, who never rivaled him in skill, painted lovely pictures, like scenes in fairyland. Watteau's "Embarkation for the Island of Cythera" is one of these beautiful pictures. Watteau died very young.

Then, in England, came Hogarth, who painted as if he saw people on the stage of a theatre, and who began the English style. He was a social satirist, besides being a very great portrait painter, as his picture of himself and his dog proves.

REYNOLDS WHO PAINTED PORTRAITS, AND TURNER WHO PAINTED THE SUN

After Hogarth in England came Sir Joshua Reynolds, the first President of the Royal Academy, and Gainsborough, his great rival, who painted most of the celebrated people of England, when men wore powdered wigs and rode in sedan chairs. Reynolds' picture of a little girl, called "Innocence," and Gainsborough's picture of "The Blue Boy" are known to nearly everyone.

Then came a painter of landscapes, Constable, some of whose pictures we may see at the Metropolitan. And soon came Turner, one of the greatest landscape painters of the world, who painted the sun and the skies, the sea and the meadows, ships and harbors, castles and rivers with astounding beauty and poetic feeling. His famous and beautiful picture of Nelson's old battleship, "The Fighting Téméraire," is a very different picture from the funny old drawings made on reindeer bones by the men who lived in caves, long, long ago.

THE BEGINNING OF MODERN PAINTING

Giotto, who painted this picture of the death of St. Francis of Assisi, is called the first modern painter. He was the first great artist who painted objects and human figures so as to make us realize that they lived and had form. His drawing is considered faulty, the figures clumsy and heavy, and the perspective wrong; but he was the first to depart from the stiffness of the Byzantine artists towards freedom of composition and dramatic life and movement, apart from the formal beauty of harmoniously arranged line and color.

This group of Christ and His disciples, from Masaccio's fresco painting of "The Tribute Money," shows us another step forward in modern painting. Masaccio departed from the prevailing practice of arranging the figures in one row, in the manner of ancient reliefs, or one above another in diminishing size. His figures occupy their right places in the receding planes of the landscape, and live in their surrounding atmosphere. They are full of dignity and expression, while the folds of their draperies are worthy of the later masters.

MASTERPIECES OF FORM AND EXPRESSION

Botticelli's strength lay in the marvelously expressive use of decorative line as found in the art of Japan. His faces are very fascinating if scarcely beautiful.

This picture of "The Holy Family," by Michael Angelo, shows his powerful grasp of the human form, his vitality and grandeur of design and composition

This fresco painting of Aurora, Goddess of the Dawn, by Guido Reni, is an essentially classical subject. It is Renaissance in style, though later in date, original in conception, graceful and full of life and movement.

Raphael combined all the best qualities of his predecessors. This painting of the Madonna and Child is quite simple, yet beautiful and intense in expression.

Leonardo was a master of line and color, and painted emotion or serenity, strength or tenderness equally well. This is his celebrated picture, "Mona Lisa."

TITIAN'S LOVE OF LIFE AND MOVEMENT

In this picture, "The Garden of the Loves," by Titian, we see the artist's love of life, of movement, and of that radiant gaiety which he brought even into his sacred subjects. The little Cupids here are sporting joyously as they gather the apples culled from the rich trees above them. Titian was, perhaps, the greatest colorist the world has ever seen, and the marvelous glow of his color is only rivaled by the rhythm and great beauty of his composition. As a portrait painter Titian easily ranks with Velasquez and Rembrandt.

The pictures on these pages are from photographs by Alinari, Anderson, Neurdein, and Mansell.

PORTRAITS THAT WILL LIVE FOREVER

This portrait of Thomas Killigrew, by Van Dyck, reflects the artist's delicate and courtly nature. His somewhat aristocratic portraits are true renderings of the souls and personalities of his subjects. Van Dyck began the school of English portraiture.

This picture of "The Laughing Cavalier," by Frans Hals, is a triumph in bold, dashing, and daring brushwork, and brilliant characterization. Hals the realist has painted laughter in all its phases. He was the greatest portrait painter of Holland after Rembrandt.

Hogarth made English art healthy, robust, and popular. He was the moralist of art, painting the vices and follies of his age. This portrait of the artist and his dog, painted by himself, shows us not only his intelligent face, but also the style of his brushwork.

In Rembrandt's work there is no hardness of line, and everything is expressed in soft lights and shadows and in soft, golden half-shadows. With him, character and soul counted more than beauty, though there is, indeed, beauty in this picture of "An Old Woman."

THE GREATEST PAINTER OF CHILDREN

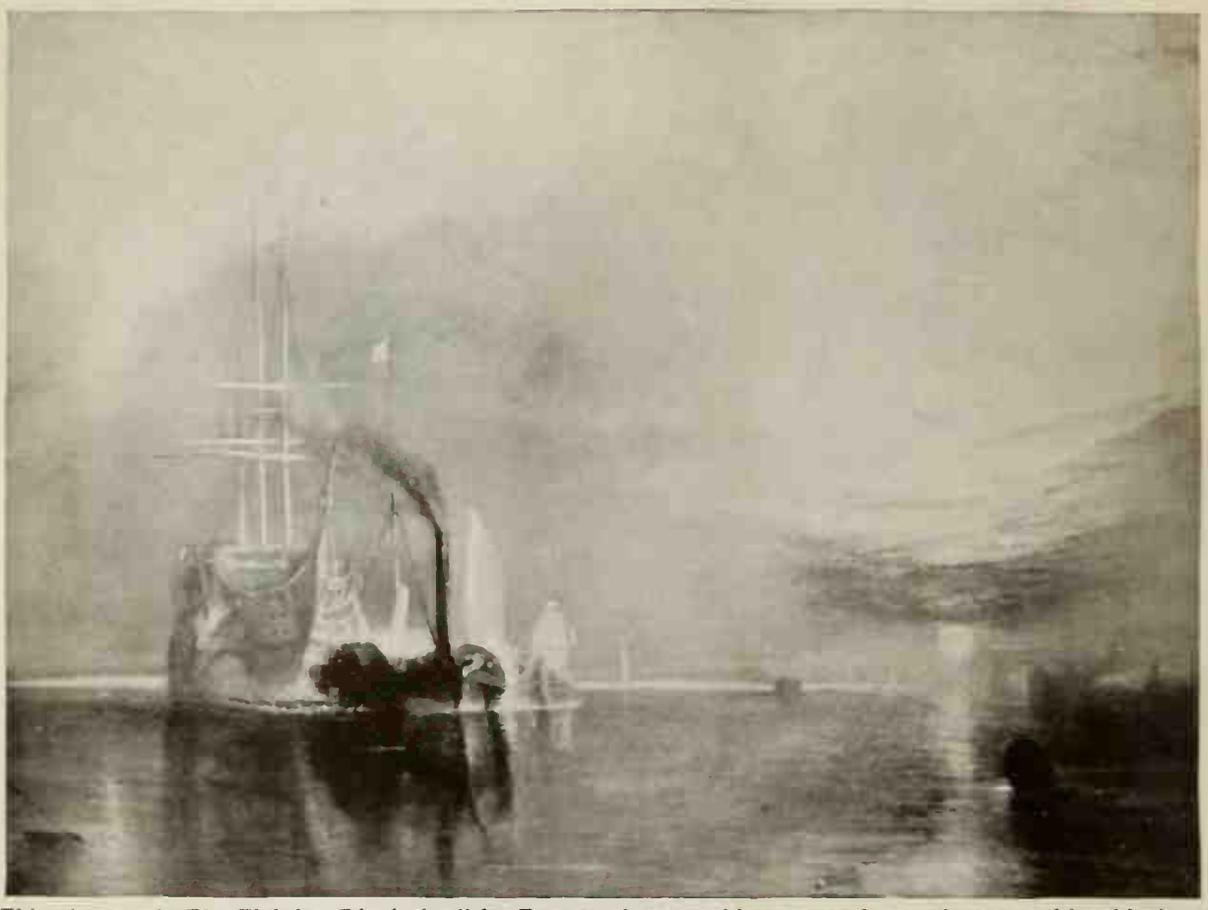
Reynolds is the king among painters of children. His children are children and not miniature men and women, as this portrait of little Miss Bowles and her dog shows. He preferred firmness and energy in his brushwork to the elegance of Gainsborough. His portraits are consequently more convincing than those of his rival, and yet they do not lack charm. The dog here seems to be longing to break from his captor's arms.

A SPARKLING LANDSCAPE & REAL PEOPLE

The English countryside inspired Constable, and into this lovely landscape he has put Salisbury Cathedral, often said to be England's most beautiful building. The cattle at the stream, the spire soaring into the piled-up clouds, and the arched frame of trembling, sparkling green leaves that is formed for the sunny meadows and the cathedral itself by the two fine elm-trees in the foreground, make a masterpiece of composition.

Velasquez, who stands on the left in this, his "Maids of Honor," was one of the greatest of the masters. Painting with sureness of touch, and using only four colors, he gives an amazing effect of reality, showing us just what we should see at one glance, the life of both body and soul being laid bare without apparent effort.

THE GLORY OF SUNLIGHT AND MIST



This picture of "The Fighting Téméraire," by Turner, shows us his greatest loves, the sea and its shipping, and the sunlight and its glorious effects on the transparent atmosphere. In Turner's best landscapes the objects and actual view are secondary. He was an idealist and a visionary who clothed the inventions of his imagination in real golden sunlight. Turner never forgot the wonderful atmospheric effects of Venice.

Watteau came near to Turner in his rendering of soft atmospheric effects, and he was very modern in his perfect balance of gaily appareled figures and fairy-hued landscape. He gave, too, a convincing air of reality to scenes which only had existence in his imagination, such as this typical picture, called "The Embarkation for the Isle of Cythera." The life he depicts is artificial, but there is nothing artificial in his style.

THE NEXT PICTURES OF FAMILIAR THINGS BEGIN ON PAGE 4697.

THE MAN WHO REFUSED A BRIBE

CONTINUED FROM 4578

IN the days when the Commonwealth had come to an end, and a king once more reigned in England, the fortunes of some of the bravest and wisest of the followers of Oliver Cromwell were at a low ebb. Milton, the poet, who had worked so hard for the Protector, was arrested and thrown into prison; and many others were harshly treated by the Royalists.

There was one faithful follower of Cromwell, however, who had a great influence under the new Government. He was Andrew Marvell, a poet and satirist, the Member of Parliament for Hull. He was returned to Charles II.'s first Parliament, and, though he seldom spoke, he was a most influential man. He bravely stood up and defended Milton, and acted so vigorously on Milton's behalf that he obtained Milton many friends.

It was Andrew Marvell's writings, however, that had most effect. They were called satires—that is, writings which bitterly ridicule the words, actions, or writings of another man. For instance, he was very indignant because Charles II. was always getting money from Parliament and wasting it. Andrew Marvell wrote a sham speech of the king on the state of his finances. Later on his writings became very bitter. He assailed the courtiers, and attacked Clarendon, the great minister, and finally he satirized Samuel Parker, the intolerant Bishop of Oxford.

Now, the king and his ministers felt that this clever writer must be silenced, and the following story is told of him:

The merry monarch, Charles II., was often delighted to meet and entertain Andrew Marvell, delighting in his ready wit, and quick repartee. One morning the king sent the Lord Treasurer Danby to seek Marvell, who was a very poor man, and earned but little more than the small salary which the town of Hull paid him as its Member. The crafty king knew this, and he told Lord Danby to use every means to win over Marvell to his side. The king authorized him to offer the poet a place at Court and a generous gift of money.

The Lord Treasurer had some difficulty in finding Marvell's lodging, but at last he discovered the house and entered abruptly.

"To what do I owe the honor of this visit?" asked Marvell, looking up from his writing.

"I come with a message from his Majesty, who wishes to know what he can do to serve you," replied Danby.

"It is not in his Majesty's power to serve me," said Marvell.

"But his Majesty wishes you to accept a post of honor at the Court."

Andrew Marvell promptly refused to accept the honor, or rather dishonor, as he counted it, saying:

"I cannot accept any post with honor, for I must be either ungrateful to the king in voting against him, or false to my country in giving in to the measures of the Court. The only favor I beg of his Majesty is that he will esteem me as dutiful a subject as any he has, and that it is more in his interest for me to refuse than accept his honors."

Lord Danby tried to persuade him, but all in vain; Marvell remained firm.

Danby then produced a bag containing £1,000 ($5,000), and placed it on the table, as we see in the picture, saying:

"The king has ordered me to give you a thousand pounds, which he hopes you will accept until you can think of some further boon to ask of his Majesty."

Andrew Marvell began to laugh.

"Surely, my lord, you do not intend to mock me by these offers. I do not need the king's gold. I have shelter; and as for my food, you shall hear of that from my landlady."

"Pray," said he, turning to the latter, "what had I for dinner yesterday?"

"A shoulder of mutton."

"And what shall I have to-day?"

"The remainder hashed."

"And to-morrow, my Lord Danby, I shall have the sweet blade-bone broiled."

Danby, so the story runs, quite overcome by the stern simplicity of the famous writer, picked up his bag of gold and returned to the king.

THE BRAVERY OF BERNARD PALISSY

IN the early years of the sixteenth century, a young workman, with a wallet on his back, set out from a village in the south of France to seek his fortune. He was a glass-worker by trade, and by means of his skill managed to earn his bread as he went along. As for book learning, he knew nothing.

This young workman, whose name was Bernard Palissy, settled down at last in a town called Saintes, and earned fair wages as a glass-painter and land-surveyor. He married soon afterwards, and became the father of a family. It was anxiety for his children which made him consider whether he could not find some employment better paid and more regular than that of painting on glass.

He knew the fine pottery covered with white tin-enamel which was made in many parts of Italy. One day he saw, among the treasures of a nobleman, a lovely plate of Chinese pottery entirely different from the Italian ware. How very beautiful it is! Ah, if he could bake common earthenware and transform it into fairy beauty like this plate, how happy he would be and what a fortune he would make!

Bernard thought the matter over, dreamed of it. Of what was this enamel composed—how was it made? He pounded every substance he could think of as likely to produce it, smeared the result over common pots, placed these pots in great heat, and baked them—in vain! His wife called him hard names for wasting his time. But Bernard was bent on discovering how to make this enamel, and nothing could stop him. He built a furnace out of doors, and went on seeking his precious enamel.

Years passed—years of failure and defeat. The neighbors thought him mad. And no wonder. He went about with tattered clothes, gaunt as a spectre, ugly as a scarecrow; the calves of his legs disappeared, so that even garters could not keep up his stockings, which fell about his ankles. His furnaces were in the open air, and Bernard would sit watching them even when a tempest was raging overhead; and when the poor fellow, drenched by rain, finally took shelter in his cottage, it was only to receive a terrible scolding from his wife.

One day, just when success seemed to be crowning all his years of effort, the fuel for his furnace gave out. Bernard rushed at his garden fence-rails, tore them down, and burned them. Still the experiment tarried, and the palings were all consumed; he ran into his house, seized tables, chairs, and shelves, and flung them into the flames. On another occasion he invited his impatient creditors to witness his success, but when they arrived they found that part of the furnace walls had fallen and ruined the whole of his work, and so they jeered at him in his despair.

However, Bernard was a genius. After sixteen years of heart-breaking failures, this ragged, lonely-souled Rip

van Winkle, with the glow of the furnace lighting up his haggard, spectral features, cried out, "Eureka!" The secret of the enamel had been discovered. He had received no sympathy from his wife. He had fought on in a terrible loneliness of heart and soul. After those long years of failure and discouragement, at last he had found a way to make the pottery.

One of the little plates made by this workman—a little plate with a lizard in the centre—was recently sold for $800!

But Bernard was marked out for suffering, not for success. Soon after he had made his discovery, he was arrested for being a Protestant, and flung into prison. The mob broke into his place, smashed all his contrivances, and destroyed his furnaces. The judges sentenced him to be burned, but a nobleman who wanted Bernard's beautiful work had him released, and for some years the potter worked for the Queen of France in Paris. Here he was famous and wealthy; but when he was nearly eighty, the poor old man was again arrested for being a Protestant. The king himself came to see Bernard in prison, begging him to abjure his faith, and saying that so implacable were Bernard's enemies that if he did not turn Catholic the king would be *forced* to sacrifice him.

"Sire, I am prepared to give my life for God," answered the old potter. "Many times you have said you are sorry for me. Know now, sire, that I am sorry for you—you, who have uttered the words, *I am forced*. That is not spoken like a king, sire."

No one could force the sublime soul of this man to lie to God.

With perfect composure this grand old potter waited calmly for the scorching flames of the martyr's stake. But before the pyre was lit—neglected, broken, and deserted—he died in his prison cell after a year's living death in the Bastille.

WHILE PALISSY GAZED UPON HIS RUINED WORK, HIS CREDITORS JEERED AT HIM

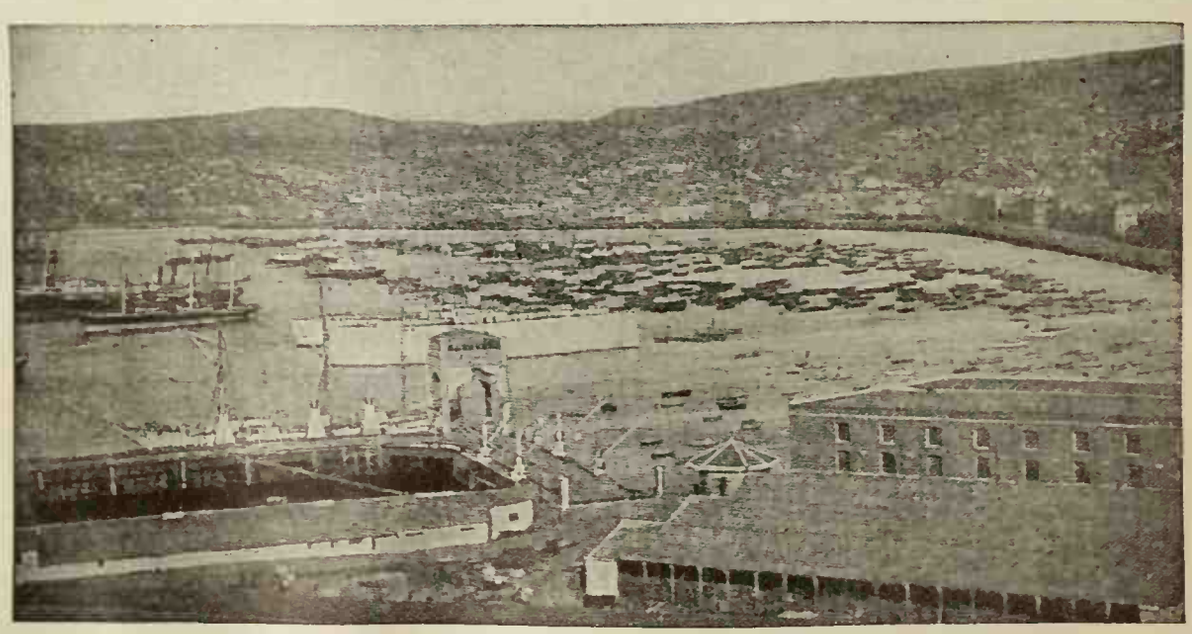
Is it not such a man as this who lights up for us the record of humanity, and who unites all classes of the community by his shining example of courage, determination, and unshakable righteousness? What a soul was that which mounted to God when the body of the potter sank breathless and cold on the floor of his lonely prison cell!

THE NEXT GOLDEN DEEDS ARE ON PAGE 4661.

Montevideo, the capital of Uruguay, is an attractive town, with wide, well-paved streets, and its principal thoroughfare is recognized as one of the finest streets in South America. Had the city half a century ago made its harbor suitable for large vessels, it might have become one of the chief South American ports.

Santiago, the capital of Chile, stands on a beautiful plain, with the snow-capped Cordilleras, a branch of the Andes, looking down upon it. The city, which is 1,700 feet above the sea, is very important.

Owing to earthquakes, and looting by the Chileans during the last war, Lima, the capital of Peru, presents a very dilapidated appearance. Its cathedral, shown here, is the most imposing in South America.



Valparaiso is the second city of Chile, but, after San Francisco, it is the most important American port on the Pacific coast. Its name means Vale of Paradise. The city is built on a sloping plain, cut up by hilly ridges that are so steep in parts as to need staircases for travelers. The bay is, in winter, a dangerous anchorage. It is open to the sea, and in winter storms, ships are sometimes torn from their anchors.

A band of gauchos, the herdsmen of the great plains of Uruguay and Argentina, branding an ox.

THE REPUBLICS OF SOUTH AMERICA

PART I

CONTINUED FROM 4514

THREE small colonies in the north of South America were untouched by the wars of independence of which we may read elsewhere in the book. These colonies are French Guiana, Dutch Guiana and British Guiana, which still belong to France, Holland and to the British Empire.

The three colonies changed hands several times. Dutch Guiana, or Surinam, was first settled by the English, but in the reign of Charles II was ceded to the Dutch, while by the same treaty New York was ceded to the English. On the other hand British Guiana was first settled by the Dutch in the seventeenth and eighteenth centuries. The colonies were captured by the British more than once and were finally ceded to them at the close of the Napoleonic Wars. Since that time there have been boundary disputes, with Venezuela, which lies to the west, and Brazil, but the boundaries were settled by arbitration. A large proportion of the population is composed of East Indians and negroes. Of the white inhabitants much the larger number are Portuguese. There have been no striking events in the history of Dutch Guiana since it became a possession of Holland. The population is small and more than half its numbers is composed of native Indians. East Indians are employed on the rice and sugar plantations. Settlements were made in French Guiana or Cayenne in the year 1626, and with the exception of a few years during the Napoleonic Wars this colony has ever since remained in possession of the French.

THE STORY OF VENEZUELA SINCE THE REVOLUTION

To free themselves from Spanish rule, Venezuela and New Granada united to form the Republic of Colombia, which included Ecuador. Simon Bolivar, "the Liberator," was chosen as first president, and the city named for him was made the capital. In 1829 the union was broken at the desire of Venezuela, and Venezuela set out in her career alone. The first president, Jose Antonio Paez, was a strong man, who had made a name as a leader during the revolution. Whether he was in or out of office, Paez held the power, and generally kept the peace, for about twenty years. Since that time the government has been very unsettled. Too often the president has come into power on top of a revolt, and the longest period of peace has been between the years 1880 and 1892,

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when, like Paez, Guzman Blanco held the power whether he was president or not. In 1910, however, Juan Vincente Gomez was elected president. He was again elected in 1915, and at the time this story was written he was still in power and seeking to give his country the blessings of a settled rule.

As we have seen, the Spanish conquerors went to the country, not to settle, but in search of gold. The first colonists did not take their families with them, and those who settled in the country freely intermarried with the natives. This was done even by officials in the provinces. The Spanish and Portuguese have never held the scorn for people of mixed race that northern people have, and consequently intermarriages continued even after settlers commenced to bring their families to the country. This was especially the case in the hot regions of the north, where European women and children found it hard to live. As a result the greater part of the population is composed of a restless, childish race, descended from Spaniards and Indians or Spaniards and negroes. Many of the Venezuelans are of course of pure Spanish descent, but they are few in proportion to the numbers of the population.

Although by law education is compulsory, there are not nearly enough schools to enable the children to be taught. A large proportion of the population cannot even read or write and you can see how easily a clever man can stir these ignorant, excitable people to revolt against the government and place him in power.

Venezuela has had disputes about boundaries with Colombia and Great Britain. You may read in the story of the United States about the dispute with Great Britain, which was settled by arbitration. The dispute with Colombia was also arbitrated, but the boundary decided upon by the king of Spain, who was the arbitrator, has never been surveyed.

There are only a few hundred miles of railway in the country and roads may be said not to exist. Consequently trade and commerce cannot flourish. About half the country is covered by forest. Another large section consists of the llanos, or great plains in the central part of the country, which are watered chiefly by the Orinoco and its tributaries. The climate of course is very hot except in the high mountain valleys, where life is very pleasant and nearly all the crops of the temperate regions can be grown.

Immense tracts of Venezuela have never been explored. In some places tribes of independent Indians live under their own chiefs. Large numbers of these Indians know nothing of Christianity, and live almost as they did when they were first discovered by Europeans. Many of them, however, are very intelligent and if treated with wisdom they could be taught many of the ways of our civilization without losing what is best of their own characteristics.

THE PROVINCES THAT WERE LOST TO COLOMBIA

A great deal of what we have said about Venezuela might just as well be the story of Colombia. There is one great difference, however: revolutions have not often succeeded, and the presidents of the republic with two exceptions have been elected. When Spanish rule was first overthrown, Ecuador and Panama, as well as Venezuela, were joined to Colombia. Ecuador declared its independence about the same time as Venezuela, but Panama continued to be part of Colombia until 1903, when it broke away. There might have been a war between the two states then, but the sympathies of the United States were with Panama, and its influence was strong enough to keep peace. The story of the revolution, however, belongs to the story of Central America, and you may read it there.

The mountains in both Colombia and Venezuela are rich in minerals. Although it has not been much worked, iron is found in both these states and there are valuable deposits of oil in Venezuela. Ecuador is famous for its emerald mines, and gold is still found in both countries.

The llanos, of which we have already told you, stretch from Venezuela into Colombia, almost to the foot of the Andes. Colombia is much more mountainous than Venezuela, and up in the mountain plateaus and valleys, there are large tracts of rich land. Bogota, the capital, is in the ancient Chibcha country, where, in spite of the fact that it is only a few degrees north of the equator, the climate is not extremely hot.

ECUADOR'S STORMY HISTORY OF REVOLUTIONS

Since the War of Independence, Ecuador has had the same history of revolution as every other South American re-

THE DAILY LIFE IN ECUADOR AND PERU

This curious market is at Guayaquil, in Ecuador. Instead of using stalls, the sellers arrange their goods in canoes, to which the purchasers go marketing.

There are extensive cocoa plantations at La Clementina, in Ecuador. The houses of the laborers are curiously built on long poles, like stilts as shown here.

Here we see a country woman of Ambato, Ecuador, in her peasant home, grinding oats to make bread.

All the boys and girls of Ecuador are compelled to go to school; but, generally, education is poor.

In this picture we see a native market at Cerro de Pasco, in Peru, where blankets, ice-cream, and vegetables are being sold, a popular mixture of goods.

These natives are traveling on the difficult road between Ambato and Riobamba, in Ecuador. The road is a mere trail, and goods are carried up by mules.

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public. The people do not really understand the meaning of popular government. The president, as a rule, is a dictator, and holds power until another leader becomes strong enough to have himself elected by force.

A large part of the country is mountainous, and the most thickly populated regions are the plateaus of which the Incas had obtained possession. Quito, the capital, where you remember Atahuallpa held his court, is only a few miles away from the equator, but it is built so high up in the mountains that it has a temperate climate. A railway and a telegraph line run from the port of Guayaquil to Quito, and there are short lines of railway running inland from the ports of Bahia and Manta. The country, as you may see from the map, lies along the equator, and the climate of the lower valleys is very hot.

Navigable rivers run through the coastal plain and in this low country take the place of roads. For the most part, the roads through the mountains are only trails, and travel from one part of the country to another is very difficult. Indeed a great deal of Ecuador has never been explored.

Uncivilized Indians roam through the forests of the coast and the east. Indians form much the largest part of the population. It is estimated that there are about 400,000 mestizos, or people of Spanish and Indian descent, and about 100,000 white people, chiefly, of course, of Spanish descent, all of whom look down upon the Indians, and treat them as an inferior race. Yet the Indians are intelligent. You remember that the Indians of the mountain regions had their own civilization before the Conquest,—and if they were wisely treated many of them could be educated.

Education is compulsory, but although there are three universities there are only about 1,300 primary schools in the whole country. As in all the other republics, many of the people who can afford to do so, send their children to Europe, or to the United States, to be educated.

BOLIVIA A MOUNTAINOUS INLAND STATE

At the conclusion of the War of Independence, Upper Peru, which had been part of the Spanish province of La Plata, elected to separate from Argentina, and took the name Bolivia in honor of the Liberator. The people were no better prepared for independence than the people of the other republics, and scarcely had a president been chosen when bloody revolution followed after revolution with bewildering changes of government. Not content with fighting in their own country, the Bolivians interfered, in 1835, in a revolution in Peru. Chile then attacked Bolivia and there were some years of warfare between the three states.

The limits of the Spanish provinces had never been defined properly. The boundaries, therefore, which the republics inherited were very vague, and the want of a definite statement of the territory of each country has led to many disputes. Bolivia and Chile had such a dispute about forty years after they won independence. The question was settled then by a treaty by which the boundary line was defined and Chileans were given the right to mine nitrates in the desert of Atacama. Later on a dispute arose over a question of duty to be paid on the nitrates, and Chile seized one of the Bolivian ports. Bolivia declared war, and Peru, which had a treaty with Bolivia, was drawn in. The Chileans were victorious on land and sea. Peru, weakened by revolutions at home, made peace, and thus left alone, Bolivia, which was also weakened by revolution, had no alternative but to sign a treaty of peace dictated by Chile. By this war Bolivia lost all her coast line and is now an inland state. Some years later she had a boundary dispute with Brazil, which was settled by Brazil paying a large sum in exchange for part of the territory in dispute.

Since this century began the elections of presidents have been peaceful. The country is quieting down to a settled rule, and is becoming much more prosperous. Its wealth lies principally in minerals. Much silver and tin are exported, but since the independence of the country became a fact the gold mines have been little worked. The eastern provinces are rich and the forests produce large quantities of rubber. The crude rubber is made into balls which Indians make into rafts and thus float it down the River Madeira to the Amazon and thence to the sea.

Railways now run from Arica and Antofagasta on the Chilean coast to La Paz, the principal city of Bolivia. The roadways throughout the country are

A GREAT CATTLE-RANCH IN URUGUAY

South America is the land of cattle. They are used to draw carts and carry burdens. Here we see a half-breed Indian and his cattle-team in Ecuador.

Here we see cattle used in place of pack-horses. These oxen are taking produce to the market at Bogota, the capital of the republic of Colombia.

The huge cattle-ranches in Uruguay form one of the important sources of Europe's meat supply. The cattle are kept on undulating plains, and the herdsmen ride on horseback. Cattle and sheep rearing is the principal industry of the country. There are more than sixteen million sheep and six million cattle in Uruguay.

Much of the meat prepared in Uruguay for other countries is canned, and the hides of the cattle slain form a valuable by-product of every meat-canning works. The hides are hung in the sun to dry, and are then sold to be made into leather. The growing demand for leather makes the hides of greater value than ever.

poor. Away from the railways horses and mules are used to carry travelers through the mountains, and natives, mules and llamas carry freight from place to place.

More than half the population is composed of native Indians and more than a quarter of mestizos, the mixed race. The other quarter is made up principally of white people. Education is free and compulsory by law; but as usual in South America, the schools are few and poor. The great mass of the Indians and large numbers of the mestizos cannot read or write.

The mountain Indians are descended from the tribes which were ruled by the Incas; but centuries of oppression have made them stupidly obstinate and the great majority of them are very poor. Many of them still live in village communities such as existed in Inca times, which shows that this is the type of government which is best suited to them.

Military service is compulsory and advantage is now taken of their presence in the army to teach some of the Indians to read and write. Efforts are also being made to establish schools to teach young Indians better ways of agriculture, for these people still use the implements that were in use in Inca times.

PERU A LAND OF MYSTERIOUS RUINS

Peru is a land of great ruins. When the Spaniards conquered Cuzco and the plateau of Titicaca they found there ruins of forts, cities and temples built of enormous stones. The Incas had a faint tradition that long, long ago their ancestors, the children of the sun, had built these temples and cities. That is all we know about them. The stones used in their construction are immense. The engineering skill and the mason work of the builders were wonderful. No mortar was used to hold the stones together, and yet the walls have stood for untold centuries and it is impossible to-day to insert the thinnest knife-blade between their joints.

The greatest mystery of all is that at the time these buildings were erected the plateau of Titicaca must have been thickly populated, yet in its present state it will support only a very sparse population. Oca, which is a root something like a potato, grows there, and so does a small grain; but maize will not ripen, nor will any of the cereals introduced by Europeans. How then did a large population live? No one knows; but some students suppose that the mountains may have risen to their present height after the megalithic, or great stone, people had finished their work. Lake Titicaca is 13,861 feet above the sea and is the highest lake in all the world. The boundary line between Peru and Bolivia runs through this lake.

Peru was the last of the Spanish provinces to obtain independence. Whether the majority of the people wished it or not they had no opportunity to throw off the yoke, for the country was the centre of Spanish power, and freedom had to be brought to them from without. It was plain, of course, that as long as the Spaniards had a foothold in the country they would make efforts to regain the territory they had lost. Therefore, San Martin, the Argentine leader, and the navy of Chile under Lord Cochrane, an English officer, invaded Peru. The army of Colombia under Simon Bolivar, also gave help, the Spanish viceroy was driven out, and Peru became independent.

Independence did not bring peace. A war with Colombia was followed by the usual period of revolutions, and one revolutionary general after another made himself president, or rather military dictator. One of these was a descendant of the Incas, named Santa Cruz, who sought to make the country prosperous, and endeavored to unite Bolivia and Peru into something like the empire of his forefathers.

On the whole, however, the government of Peru has been much more peaceful than that of the other countries of which we have told you. From 1845 to 1879 was practically a period of peace. In the early part of this period the country prospered, but later too much money was spent on public works, and the government became almost bankrupt, in spite of large sums of money made from the deposits of guano and nitrate in the coastal desert and on the islands. These valuable deposits led to the disastrous war with Chile of which we have spoken in the story of Chile. During the war, the fleet which Peru had been building up was destroyed, the Peruvian armies were defeated, and Lima, the capital, with Callao, its port, were occupied by the Chileans. When peace was made in 1883 Chile was able to keep possession of the nitrate coast

SOME SOUTH AMERICAN CAPITALS

As a seaport, Buenos Ayres had many disadvantages, the principal being the fact that, though the River La Plata is here 28 miles across, it was so shallow that, until the new docks were built, moderate-sized vessels had to anchor miles from the shore. Here we see a city street, with the docks in the distance.

The harbor of Rio de Janeiro, the capital of Brazil, is the finest on the Atlantic. The bay is three-quarters of a mile wide at the entrance, and widens to fifteen miles at its head, providing fifty miles of anchorage.

Caracas, the capital of Venezuela, built on a mountain slope, is over 3,000 feet above the sea, and owing to its height, it enjoys a healthy atmosphere. The city has some fine streets and parks, and a number of handsome buildings. The district, however, is subject to earthquakes, one of which occurred in 1812, causing 12,000 deaths. Much of the western part of South America is subject to severe earthquakes.

of Peru as well as the coast provinces which she had taken from Bolivia.

Since the country settled down after the war, there have been peaceful periods, broken now and then by revolutions. Some of the presidents have been quietly elected, others have succeeded by means of civil war. Nevertheless the country has prospered, and progress has been made in industry and commerce.

The coast of Peru lies in the dry belt. Much of it is desert, but the high plain is broken by many fertile valleys, in which corn and sugar-cane are grown. Most of the people of the country, however, live in the high, cool valleys between the mountain ranges, where the ancient inhabitants built aqueducts and made terraced fields and gardens on the steep mountain-sides. On the eastern sides of the mountains Peru owns rich forest land, and part of the great central plain.

More than half the people of Peru are Indians, and more than a fourth a mixed race, so that you see less than a fourth are of pure European descent. There are a few negroes, but not many. Many of the Indians tend their flocks of llamas high up on the mountain-sides.

There are a number of railways in the country. You can go by train from the coast to Lake Titicaca, and sail down the lake in a steamboat, while from its decks you watch the Indians sail along the shores in their reed boats called balsas. Another branch of the same railway will bring you to the great copper mines or to Cuzco, the ancient Inca capital. There are other railways, but none across the mountains, and the eastern commerce reaches the Atlantic down the great Amazon waterway. All the rubber from the lowland forests comes to us in this way. Ocean-going steamboats sail up the Amazon to Iquito, and smaller boats go a long way up the rivers into the mountain valleys.

URUGUAY HAS BECOME A PROSPEROUS COUNTRY

The story of Uruguay is bound closely to the story of Brazil and Argentina, as each of these great republics sought to make the little state part of its territory. At one time Brazil succeeded in conquering Uruguay; but in a few years the Uruguayans regained their independence. Then followed a period of civil war between parties called "the reds" and "the whites," and for nearly half a century the country was kept in a state of distraction by the rival parties. In the last years of the nineteenth century, however, a period of orderly government began, and in spite of one or two efforts at revolution the country is becoming a prosperous modern state. Like all the other states of which we have been telling you, education in Uruguay is compulsory, but there are not enough schools.

The gauchos, who compose a large part of the population, are of mixed Spanish and Indian descent. The Indian tribes were practically exterminated in a war in which they sought to drive out the Spanish invaders. There has been a good deal of immigration into the state, chiefly from Italy, Brazil and Argentina.

PARAGUAY, THE INDIAN REPUBLIC

The story of Paraguay is a tragic one. The population is almost entirely composed of Indians of the Guarani tribes, who when the Spanish entered the country had already learned the simple forms of cultivation. They were a peaceable people and easily conquered by the Spanish, and as we told you in the first story of South America, many thousands lived at one time in Jesuit missions. After the country became independent these simple Indians were easily dominated by the white inhabitants and for about fifty years the land was ruled by dictators. The first of these, José Francia, who ruled for nearly thirty years, literally turned the country into a "hermit land." None of the inhabitants were permitted to leave. No foreigners were allowed to enter. It is said that this policy was in a sense a good one, since it forced the people to rely upon themselves and to learn to supply their own needs.

He was succeeded by Carlos Antonio Lopez, who changed Francia's plans, tried to establish commerce and began to build railways. Under his rule the country began to gain in prosperity. He was succeeded in power by his son, whose mind was filled with wild ambitions. In an endeavor to carry them out, he began a war with Brazil, Argentina and Uruguay, which ended only with his death. When it was over, out of over a million and a quarter people, less than a quarter of a million were left. The war came to a close in 1870, and since that time peace has been broken only once.

THE NEXT STORY OF COUNTRIES IS ON PAGE 4841.

TWO MOUNTAIN TOWNS IN PERU

Cerro de Pasco is built over a silver mine and there are literally hundreds of silver and copper mines in the mountains around it. The city is built up in the mountains, 14,000 feet above the sea. In spite of the riches by which it is surrounded, it is, like most mining towns, very ugly. Most of the mines are owned by Americans. Many of the mine officials find it difficult at first to live in the thin air of this region.

This is the market-place in the mountain town of Tarma, not far from Cerro de Pasco. The men and women who are showing their wares on the ground are Indians and Cholos, as the Peruvians call the mixed race descended from Spaniards and Indians. Such a scene as this is common in all the towns and cities in Peru. The ancestors of these people tilled the irrigated valley fields and terraced mountain sides long before the Spaniards came.

A MENAGERIE RACE IN A GARDEN

One of the best methods of brightening up a dull afternoon is to hold a menagerie race. First of all we must collect the animals, such as cats, dogs, rabbits, or fowls, that are to take part in the race, and harness them with string, as shown here, so that we can drive them. There need be no cruelty of any kind.

As a rule, the animals will go anywhere but in the right direction, which causes much merriment.

This turkey evidently felt hungry after the race began, for it strutted into the yard in search of food.

A young puppy is not very easy to manage, as we shall soon find out if we drive one in the race.

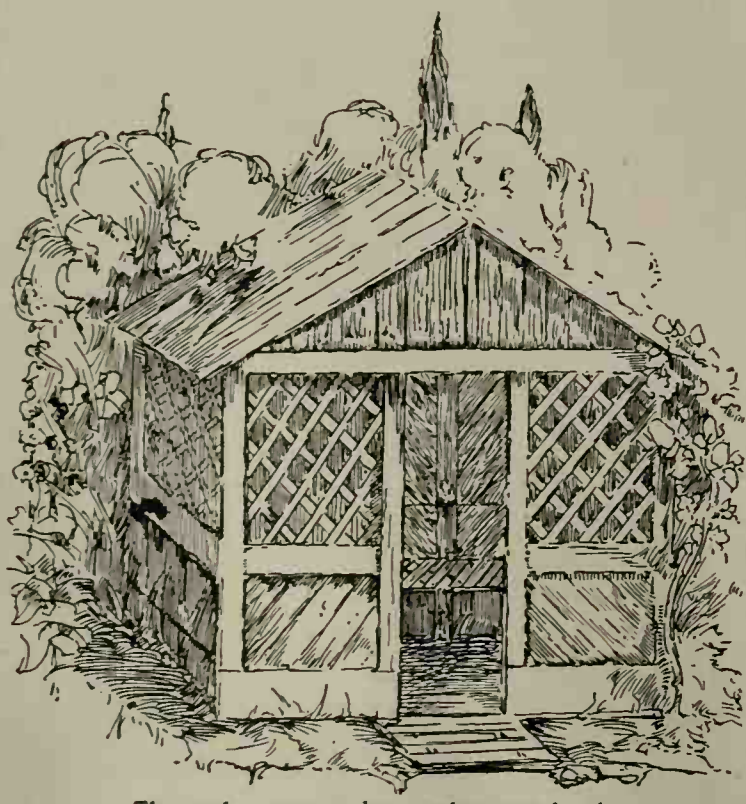
Instead of making for the winning-goal, this goose is steering straight for a pond.

The race is not always to the swift, as we see by this picture, which shows a fox cub creeping past the winning-goal first.

MAKING A SUMMER-HOUSE

CONTINUED FROM 4500

A GARDEN summer-house may seem to be far beyond the skill of the boy carpenter, but it is not difficult at all. Size does not mean difficulty. Indeed, the garden summer-house, which we shall see how to make in this article, is really much simpler to construct than many of the things that are smaller. It will be suitable for any situation, but if it is to be placed in a corner or against a wall, the sides that face the wall or walls need not be finished so carefully as the front and those sides that will be exposed to view. We require, first of all, seven wooden posts eight feet long and three inches square. We first of all chamfer two edges of each post from top to bottom. By chamfering is meant to cut or shave off a corner. Picture 1 on the next page shows a small piece of wood that has been marked for chamfering. The shaded corners show the wood that must be cut away, and to the right of it, in picture 2, we see how the post will look when chamfered, if viewed from the top or from the end. We chamfer the four corner posts on three edges and the others on two edges only. The chamfered edges serve no purpose except to improve the appearance. The next thing we do with our posts is to cut away one end of each to a point, as in picture 3. The easiest way to do this is to make a pencil-line on all four sides of the post about four inches from the bottom. Then on each side we draw with a pencil two lines from the end of the pencil-line to a point right at the end of the post and midway in its width, as seen in picture 3. Now we take our saw—a cross-cut saw is best—and saw right through from the sloping line on one side to the corresponding mark on the opposite side. We should begin the sawing from the side of the post, not from the bottom. When we have sawn four pieces from the post in this way, it will be pointed as seen in picture 4. All the posts should be treated in this way, after which they are ready to be driven into the ground.

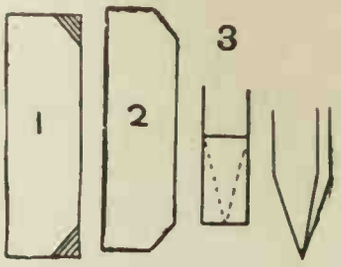


The garden summer-house when completed.

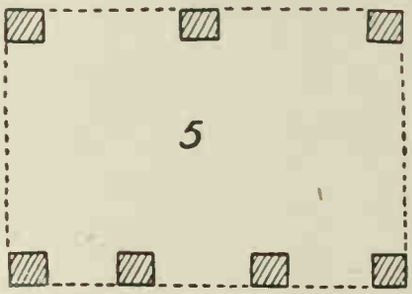
The ground upon which our summer-house is going to stand should be level. If it is not level, we should make it level with a spade. Now we measure off the distances so as to find the points where our posts should be driven in. We drive in three posts for the back

and four for the front. Picture 5 shows the distances between the posts, and therefore the distances that should be measured off. We can see the way in which the seven posts have to be arranged. The single post in the middle of the back is to give additional strength, and the two middle posts in the front will do for door-posts.

To drive in the posts, one boy holds a post with its point on the ground at the proper spot, and another boy, on the top of a step-ladder or a big box placed for the purpose, strikes the top with a heavy coal-hammer. As it is desirable not to injure the post that is driven in, it may be well to hold another piece of wood on the top of the post being struck, so that it may receive the force of the blow. The posts should be driven into the ground about two feet, and it is important that they should all be the same height. We can see if the tops of the posts are level by putting a plank across from one to another and testing it with a spirit-level. We can tell if the posts are upright by tying a small weight to a piece of string and allowing it to hang down from one edge of the side of the posts. If the lines made by the string and the side of the post are parallel, we know the post has been driven in straight, and we may then proceed with the next part of the work. Picture 6 on this page shows this frame at a later stage in the work. Here we have some boards about eight inches wide nailed along the bottom and along the top, and we have also horizontal ribs put in about midway in the height between the upright posts. The top and bottom boards are easily put in. It may require a little care at fitting the ends, but any boy will be able to find the proper way to do it as he proceeds. But the horizontal stays require some explanation. They should be made of the same size of wood as the posts, three inches square, and the two front edges should be chamfered like the posts. Then both ends of each horizontal stay should be cut in the manner shown in picture 7. This is called checking. The thin piece sticking out at each end is nailed to the upright post. An even stronger way of making these horizontal pieces is to cut them to a bevel, as illustrated in picture 8, and to cut out the upright posts to fit this bevel, thereafter putting two nails in from the back of the stay. This gives a little more work, but it is much the stronger method, and there will not be so much difficulty in fitting the ends of the stays where one stay touches another, so we should adopt this method.

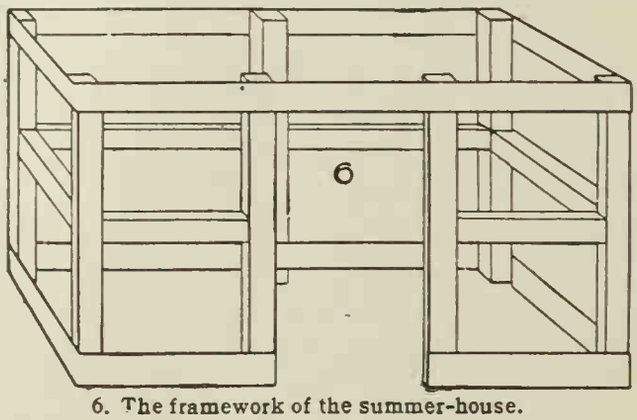


1 and 2. A board marked and cut. 3 and 4. A post marked and pointed.

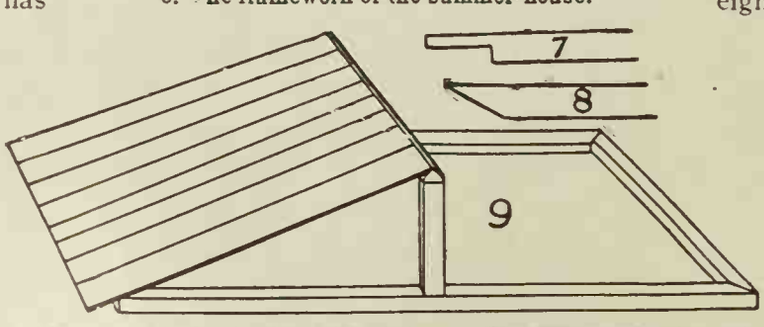


5. How the post should be placed.

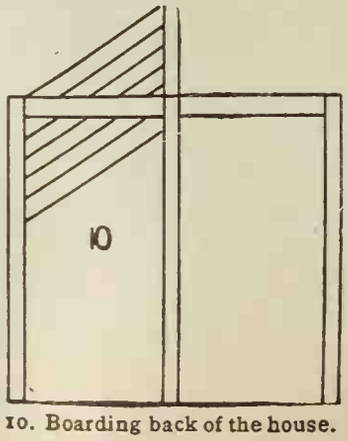
Our summer-house is still without a roof. We shall give it a roof of some ornamental form. We take four posts three inches square and cut them to the same length as the back and front and sides of our house. Then we must lay these pieces on the top of the upright posts and nail them, taking care to unite them carefully at the corners. Then we take a similar piece of wood and fix its bottom end to the middle of the top rail in front, and another piece to the middle of the top rail at the back. These two pieces should be of equal length, anything from twelve to eighteen inches. To the top of these again we nail a three-cornered piece right across from front to back. The skeleton of the roof as we have described it is seen in picture 9. Now let us nail on flat boards from the top, or apex, of the roof to the sides, allowing them to project at each side about six inches. Now we nail flat boards up the back, inside the summer-house, putting them on slanting, as seen in picture 10, and enclosing the back entirely. We treat the lower portion of each side and the front, excepting the doorway, in the same way, but we may put a slight chamfer on each board, all of which should be the same width, thereby giving a very pleasing effect. The upper half may be fitted



6. The framework of the summer-house.



7. A post checked. 8. A post beveled. 9. The way to make the roof.



10. Boarding back of the house.

with trellis-work, as in the picture on page 4613. Now we can paint the whole woodwork a soft green color, giving it no fewer than two coats of paint, and three for preference. The roof should be covered with light roofing felt, which can be purchased at any large hardware shop, and which should finally be given a coat of tar and sprinkled over with sand.

Our summer-house is now without seat or floor. We shall remedy these omissions. The earth floor should be beaten down hard and level. The best thing to do then is to make two wooden mats which, together, cover the entire floor. Three shorter posts should be driven in to carry the seat, then a front and back rail should be nailed on, and, finally, the slots for the seat will make it complete. If we like we can fill in the openings or window-spaces with trellis-work, which may also be painted green. We shall then have a strong, serviceable, and artistic summer-house. The inside of the summer-house may be varnished, and the inside of the roof will look well if painted in stone-color. A rustic table and white tablecloth may be added to complete the comfort of the summer-house, and curtains and ferns will help to decorate the interior, while the floor may be covered with linoleum.

If we can, we should dig a shallow trench round the walls, just a few inches clear of the posts. This will prevent the floor from becoming flooded in very wet weather.

PUZZLES WITH PAPER AND SCISSORS

THERE are many curious ways in which boards or cards of one shape may be cut up into a comparatively small number of pieces, and the pieces rearranged so as to form an entirely different shape.

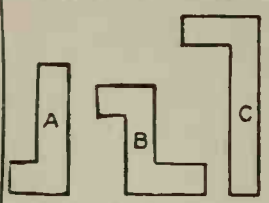
For instance, a carpenter had to mend a hole in a cupboard door, the hole measuring six feet by one foot, and all the wood he had for the purpose was one piece measuring four feet by eighteen inches. His employer told him that this piece could be cut into two pieces and put together so as to exactly fill the space without any overlapping. The carpenter was greatly puzzled at first, but after measuring the wood, and carefully considering, he took his saw and sawed it into two pieces which, when put together, filled the hole exactly. How did he divide the wood? We should cut out of paper the shape of the piece of wood the carpenter had, counting inches for feet, and see if we can do with it what he did.

Another carpenter was given a plank of wood measuring fifteen feet long by three feet wide, and with this he was told to put down a floor in a cupboard which was exactly square, but he was on no account to cut the plank into more than five pieces, four of which were to be equal in size. He thought for a few minutes and then cut the plank as instructed, and the five pieces of wood exactly covered the square cupboard floor. Let us cut out a piece of paper like the plank, reckoning inches for feet, and see if we can cut it as the carpenter did, into five pieces that will form an exact square.

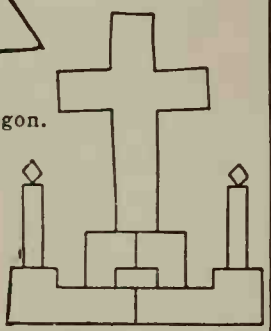
There are many other puzzles of this kind that will afford a great deal of amusement and will exercise our skill and ingenuity. If we take a sheet of paper and cut out from it four of each of the three shapes given in picture 1, we can fit these twelve pieces together so as to form an octagon, or eight-sided figure. We can easily trace the shapes from this page, and then cut them out of stiff paper or cardboard as suggested.

Another interesting puzzle of this kind is to cut out eight squares, then to take four of them and divide each of these into two equal triangles by cutting across from corner to corner. We now have four squares and eight triangles—twelve pieces in all. Now let us fit these pieces together so as to form a perfect square. It is very easy to do when you know the way, but it requires thought and skill.

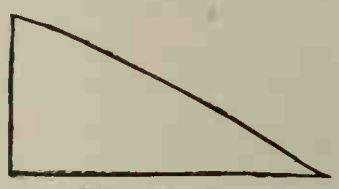
1. Pieces to form an octagon.



2. To make a cross.



3. The puzzle cross.



4. The triangle puzzle.

Here is another puzzle of a similar kind. Cut out three pieces of rather stiff paper of the shape of A in picture 2, and one piece each of B and C. Now put these together to form a cross.

Still more ingenious is this puzzle. The cross with candles in picture 3 is made up of nine pieces, as can be seen. Take a piece of paper, oblong in shape, say, four inches by two and a half inches in size, and fold it in such a way that with one cut of the scissors you divide the sheet into the nine pieces that will form a cross and candles like those shown in the picture. It can be done quite easily.

Another interesting puzzle is to cut out in paper or card twenty triangles, the shape of that in picture 4, and to arrange the twenty triangles so that they shall form a square.

Some curious results may be obtained by drawing triangles. Here is an example. Cut out of a piece of paper an equilateral triangle, that is, a triangle that has all its sides equal. Now let us draw upon the triangle thirty straight lines in such a way that we make the greatest possible number of triangles. What is the largest number that we can make?

The solutions to all these very interesting puzzles will be found upon page 4713.

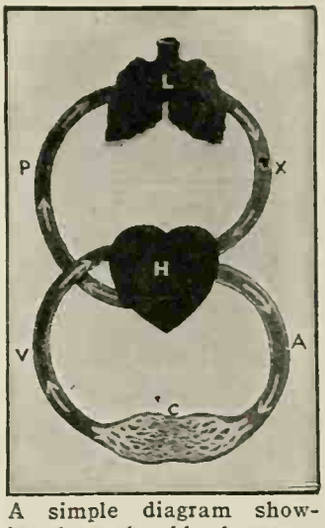
MANY WAYS OF STOPPING BLEEDING
A FIFTH LESSON IN FIRST AID TO THE INJURED

CONTINUED FROM 4383.

QUITE a common form of accident is that in which some blood-vessel is injured, and the blood begins to leave the body. Sometimes the wound may be caused by the end of a fractured bone piercing the blood-vessel; at other times it may be caused by a knife or a piece of broken glass, or some similar object with a sharp point or edge; but, however the wound may have been caused, it is essential that the bleeding be stopped at once, and so first aid is particularly valuable in injuries of this kind.

The proper name for bleeding is hæmorrhage, which is made up of two Greek words meaning *blood* and *to break*, so that hæmorrhage really means bleeding through the breaking of a blood-vessel. Hæmorrhage may be either arterial, venous or capillary.

Before learning how to stop bleeding we must again examine the picture, which we studied in an earlier lesson, showing the main arteries of the body and the spots where, in case of injury, we apply pressure in order to stop the bleeding.



A simple diagram showing how the blood moves in the arteries and veins.

When we injure ourselves and blood comes from the wound, this blood is sometimes bright scarlet in color, and at other times it will be a dark red. Then the blood may spurt out of the wound, or it may ooze out, or it may slowly trickle. It is the color of the blood, together with the manner in which it comes out, that enables us to know where the blood comes from—whether from an artery, or a vein, or a capillary. This knowledge is very important.

First of all, we must know how to recognize arterial bleeding. It is the most serious kind of bleeding, and when one of the larger and more important arteries is injured it is very dangerous. Many a man who has received an injury to a large artery has had his life saved by first aid skilfully given.

How to fold a pad.

In arterial bleeding the blood is bright scarlet, and spurts out in jets, this spurting being caused by the pumping action of the heart. At each pump of the heart a jet of blood is spurted out.

In bleeding from a vein, which is called venous hæmorrhage, the blood is dark red and flows in a slow, steady, trickling stream.

Capillary hæmorrhage is the least serious of all, and usually occurs when we have a slight cut or graze. The blood is red, and oozes from the wound, and it soon stops flowing because the blood clots and stops up the cut. If it does not stop of its own accord, we can make a small fold of lint or clean linen rag, and tie this upon the wound. The pressure usually stops the bleeding in a few seconds.

To stop arterial and venous bleeding different methods are used, but there are one or two general principles that must always be considered.

First of all, we should remember that all bleeding can be stopped for the time being by pressure with the fingers, and therefore the first thing to do in a case of injury is to use pressure, even before we consider whether the bleeding is arterial, or venous, or capillary. Then, in the second place, let us remember that blood, like water, never runs uphill unless it is forced to do so. Therefore, the injured limb should be slightly raised or the patient should be so arranged that the blood is not allowed to run down and out of the wound. All tight-fitting garments, such as collars and garters, which would hinder the free return of blood to the heart, should be removed at once. Before learning how to stop bleeding from arteries and wounds we must remind ourselves of the direction in which the blood flows through these vessels. As we know, in the arteries the blood is always passing away from the heart, while in the veins it is passing towards the heart. If we think for a moment, we shall see that the point at which we press to stop bleeding will be different in the case of arteries from what it is in the case of veins, simply because the blood is passing in different directions in the different kinds of blood-vessels. The simple diagram on this page will show how the blood circulates in our body. The pure blood, bright red in color, is pumped from the lower part of the left side of the heart, H, through the arteries, A, into the capillaries, C. From these it passes into the veins, V, having now become impure and dark in color. The veins carry the blood back to the upper right-hand side of the heart, from which it passes to the lower part of the right side, and is then pumped through an artery, P, called the pulmonary artery, which means simply the lung artery, and is carried to the lungs, L. There the blood is purified, and is carried back to the upper left-hand side of the heart by the pulmonary, or lung veins, X. The blood is bright red in all arteries, except in the pulmonary artery, where it is dark and impure; and it is dark red in all the veins with the exception of the pulmonary veins, where it is bright red and pure, because it has come straight from the lungs.

To stop bleeding from an artery, first of all we press with the fingers, and as most of the larger arteries run close to the bones, we can press the artery against the bone. In arterial bleeding we must always press on the side of the wound nearest to the heart, and thus meet the blood coming from the heart, as it were, and stop it spurting out of the wound.

There is a spot in most of the larger arteries where pressure can be applied with the greatest advantage, and this is called the pressure point. We should look again at the picture of the arteries which we saw when we were learning the positions of these important blood-vessels, and should notice exactly where the pressure points are for the various arteries. The pressure to be effectual, need not be severe, but must be accurately applied.

The pressure may sometimes be applied to the wound itself, and in this case we press on the point that is bleeding, with finger and thumb, and so close the hole in the artery from which the blood is coming.

But, of course, the pressure of the fingers is merely to stop the bleeding for the time being. So, as soon as we can, it will be necessary for us to prepare and apply a pad and bandage to the wound, and press the artery at the pressure point with what is called a tourniquet. Tourniquet is a French word meaning a little turn, and the instrument consists of a special strap-bandage with a screw attached. But, of course, in rendering first aid we shall almost certainly not be able to get a proper medical tourniquet, and we shall therefore have to make one up.

Twisting a bandage.

First of all, we apply a pad and bandage to the wound. We take a piece of sterilized gauze, which can be bought at any druggist, or a clean handkerchief, and fold it into a pad. The way to do this is to spread out the handkerchief, fold the corners to the centre, as in the picture on page 4616, fold over again at the dotted lines, and keep on doing this until a hard pad of the required size is formed. We place the smooth surface of the pad to the wound, and secure it in position with a bandage or another handkerchief tied round the arm as in the case of fractures. Sometimes it may be useful to put a small smooth stone inside the pad as this will considerably stiffen it.

For a tourniquet we make a pad in the manner just described, putting a smooth stone inside. This we place accurately on the pressure point of the artery, and keep it in position by passing a medium or narrow bandage round it twice and tying it on the side opposite to the pressure point. Then between the bands of the bandage we pass a strong stick, or any similar object, and twist it round and round as shown in the picture on this page, until the pressure of the pad stops the flow of blood. The stick of the makeshift tourniquet can be kept from springing back by tying another bandage over it. If we have no proper bandage to hand and are compelled to use an ordinary pocket-handkerchief, or something that will not go round the injured limb twice, we can, after placing the pad on the pressure point, pass the handkerchief round, tie the ends in a half-knot, then place the stick upon this, and tie the ends again in a reef-knot. We can then twist the stick round until we are successful in stopping the flow of blood. If there should be no stone, cork, or other small, hard object available for placing in the pad, and even no spare handkerchief from which to make the pad, we can tie a hard knot in the handkerchief which we tie round the limb, carefully seeing that the knot is placed exactly on the pressure point.

The patient should be laid down, if possible, and the injured part should be raised so that as little blood as possible may flow into it. The clothing should be removed from the wound in the correct way which we already understand. If there is anything in the wound, such as pieces of broken glass, earth, and so on, these must be removed, but we must not interfere with the wound in order to find things which we cannot see. If a clot of blood forms over a wound, this should never be disturbed, as it assists greatly in stopping the bleeding. No attempt should be made to wash a wound except with cold water which has been previously boiled.

The treatment applied for stopping bleeding from a vein is almost exactly the same as that used in arterial bleeding, except that in this case we apply the pressure to the vein on the side of the wound farthest from the heart. For an explanation of this we must glance at the diagram on the previous page. The blood is traveling along the vein towards the heart, and so we meet it, and by pressure prevent it reaching and coming out of the wound.

A common form of venous bleeding is from varicose veins. Varicose comes from a Latin word meaning bent, and a varicose vein is one which is stretched, owing to the blood accumulating in the little pockets behind the valves. Instead of being even and smooth as a vein should be, the varicose vein has swellings along its course like beads, and a slight injury will often cause the vein to bleed.

Varicose veins usually occur in the legs, and are due to various causes. Too much standing may give rise to varicose veins, and another very common cause is the wearing of tight garters. Boys and girls should always be careful that their garters are not tight Very many people have had to suffer late in life because, when they were young, they or their friends did not exercise proper care over this apparently little but important detail.

CONTINUED ON PAGE 4828.

HOW TO UNDERSTAND A SHIP

THERE are few things more deeply interesting than learning about the various parts of a ship and how they came to be called by their present names. Frequently we see some part of a vessel mentioned in a book or in the newspapers, and sometimes we have not the remotest idea of the meanings of the terms used. In this article most of the commonest mentioned terms are fully explained, so that all of us can understand them.

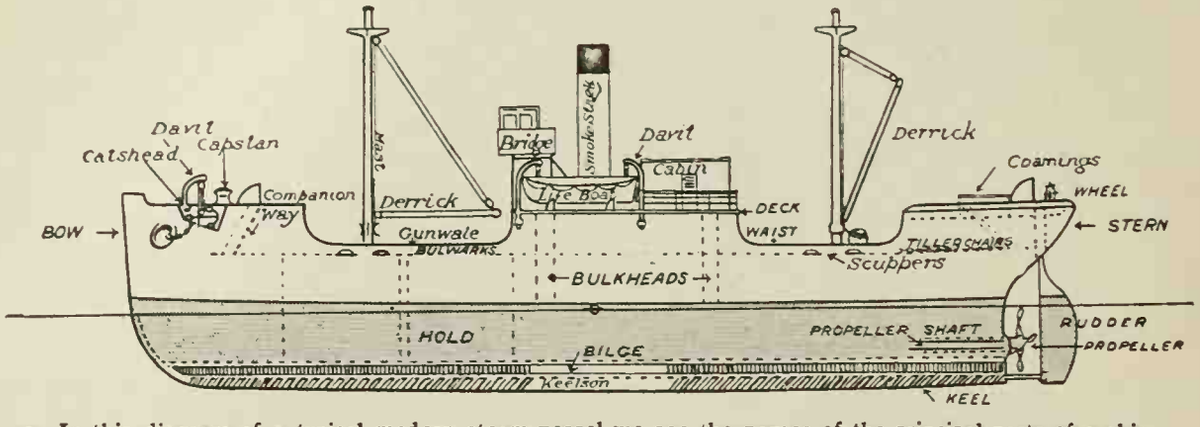
If we turn to page 251 we can see how sailors make their knots, while on page 3326 we see the methods by which they splice ropes, and on page 3959 and succeeding pages we learn the names of the different kinds of ships and sails, so none of these things will be dealt with here.

As we all know, the body of a ship without the masts is called the *hull*, which comes from the word "hole." The hull is simply a big hole with a bottom and sides, enabling it to float on water. The word *hold* also comes from the word hole. It is now applied only to the inside part of the hull where goods are stowed during the voyage. The *keel* is the long beam which goes along the bottom of the ship in the middle. In battleships and steamers this part, of course, is of steel or iron. Its purpose is to give strength and steadiness to the ship. The word comes from the Icelandic word *kiolr*, which also means a keel, and is an interesting record of how the old vikings of the North gave some words to the English language. The *keelson* is the beam in the middle of the ship's bottom to which the keel is bolted. It really means "sill of the keel." The Swedish word for sill is *svin*.

Sailors talk of a ship floating on an *even keel*. This means that her decks are quite horizontal. When sailors speak of *fore and aft*, they mean the front of the ship and the back of the ship.

The *bulwarks* of a ship are the raised sides above the top deck. They have a rail on top. Any protecting wall is called a bulwark. The meaning of the word was originally "work made with the trunks of trees." The Danish word for the trunk of a tree is *bul*, and for work it is *vaerk*. In primitive warfare the readiest means of defence was to fell trees and to take refuge behind the fallen trunks. The *gunwale*, which is sometimes spelled *gunnel*, is the side of the ship just below the bulwarks. The old Saxon word *walu* meant a stripe, or plank, and the guns in the old battleships used to be mounted above the upper wales, so that the word gunwale came to be applied to them. The *bilge* of a ship is the very lowest part at the bottom of the ship under the hold. The water that always finds its way into this part is called bilge-water, and it is pumped out periodically. Bilge simply means bulge. It is the part where the bottom of the ship bulges downwards, as we see in picture 1.

The *bridge* is the raised structure in the middle of the ship, where the captain or pilot stands when he steers the ship. It is so called because it takes the form of a bridge. The *helm* is the steering apparatus, and in a modern ship it includes the rudder, tiller, and wheel. The original meaning of the word is handle, and the German word for handle is *helm*. The *rudder* is the flat, vertical blade at the back of the ship, by which the vessel is steered. It is also called the helm, but, properly, it is only part of the helm. The most primitive method of steering a boat is by putting an oar into the water behind the boat and moving the oar from side to side. This is why we have the word rudder. The Saxon word for oar was *rother*, and the German word for oar is *ruder*.



1. In this diagram of a typical modern steam-vessel we see the names of the principal parts of a ship.

In some boats the long piece of wood at the top of the rudder that forms a handle by which the boat may be steered is called the *tiller*. In Anglo-Saxon the word *tyllan* meant to lead aside, and by moving the tiller a boat is made to go to one side or the other. In large ships the tiller-ropes or tiller-chains connect the rudder with the steering-wheel. The steering-wheel is a large vertical wheel, the movement of which operates the rudder from side to side and so steers the vessel.

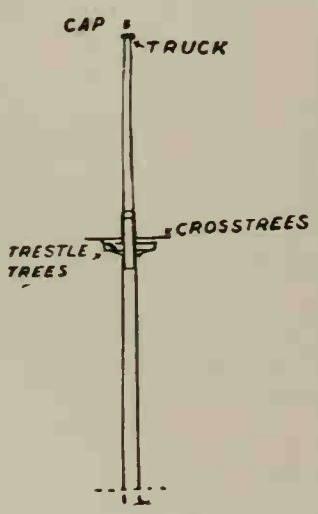
In a small rowing-boat there is usually no tiller, but on top of the rudder there is a flat piece of wood with a rope at each end, and the boat is steered by pulling the ropes. This flat piece is called the *yoke*. The word came from the Saxon word *geoc*, which came from the Latin word *jungo*, which means "I join." The yoke of a rudder is not unlike the yoke used, for oxen and horses in some foreign countries, and the word used is the same in both cases.

The cabins of a ship are the rooms where the passengers or the crew live and sleep.

The word cabin means a small hut, or cottage, and it is used for a small house on land as well as for the living-room or rooms of a ship. The word companion has a curious use on board ship. The *companion* is the window-frame or skylight through which light is admitted from the deck into the cabin or to the lower deck. The *companion-way* is the staircase that leads from the deck to the cabin. The *companion-ladder* is the ladder by which the ship's officers reach their cabin from the deck, and the hood placed over a companion-way is called the *companion-hood*.

2. The load-line.

The origin of the word companion and its use on board ship are curious, and show how the meaning of a word changes through the course of years. It properly means "with bread," coming from the Latin words *con*, with, and *panio*, bread, and in ordinary use companions are people who have eaten bread together. In the old French language the word *compagne* meant the pantry in a galley, and then, as ships became bigger and more luxurious, the word stuck to the parts of the ship that we have seen. The part of a hatchway that protrudes above the deck is called by the curious name of *coamings*, but how this word came to be used is, at present, quite unknown. The *coamings* or raised edges of the hatches are designed in order to prevent the water on deck from running below.



3. The mast.

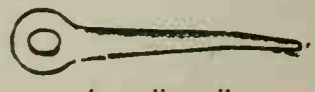
We all know that a beam is a long piece of wood, but when we hear people talk about the beam of a ship we may not understand what is meant. Beams are put across a ship from side to side of the hull, so as to give strength and stiffness, and these are still known as the beams, although in modern ships they are chiefly made of steel. But the word is more generally used to indicate the width of the ship, so that when we talk about a ship with a forty-foot beam we mean that its width from side to side is forty feet. The ship's *waist* is the middle part of the ship.

The expression that a ship *draws* twelve feet of water, or that it has a *draught* of twelve feet, means that when the ship is lying in the water the depth of water from the bottom of the keel to the surface of the water does not exceed twelve feet. When the ship is loaded with cargo we talk about *load-water draught*, and when there is no cargo in the hold we talk about *light-water draught*.

Upon the side of all British ships there is what is called the *load-line*. It is a mark like we see in picture 2. It means that the captain must not permit his ship to be loaded enough to sink below the surface of the horizontal line going through the circle.

To *moor* a ship is to fasten it by ropes or chains to the quay, or to let out the anchor, so that the ship remains in one place. In the latter case we say that the ship *is at anchor* or that it *rides at anchor*. The word *moor* means to tie, and it comes from the Anglo-Saxon word *merran*, which means to tie. The *moorings* of a ship are the various chains and ropes used to make a ship remain by the quay or at its anchorage.

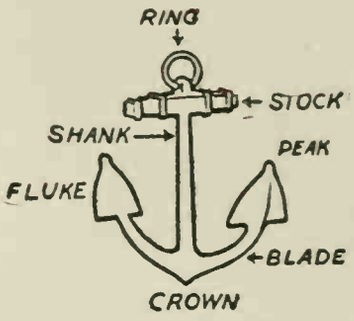
Everyone knows that the *anchor* of a ship is an instrument of iron or other heavy material used for holding ships in any locality required, but everyone does not know that the word came to us through Anglo-Saxon and Latin from the Greek word *ankyra*, which means a hook. The common form of anchor, as shown on page 4620, consists of the centre part, which is called the *shank;* the two curved arms which make the points are called *flukes*, and thought to be derived from the German word for wing. The flukes join the shank at the place that is called the *crown*. The cross-piece at the head is called the *stock*, and the part of the shank above the stock is the *head*, upon which is the *ring* or *shackle* to which the rope or chain is attached. When we say that a ship drags its anchor, we mean that the anchor when thrown into the sea, or *cast*, fails to hold on the bottom, and that the ship moves along with the wind or current, dragging its anchor with it. The anchors and the chains or ropes attached to them are called *ground-tackle*. See pictures 5 and 6. The two words *windward* and *leeward* are frequently used. The former almost explains itself. Windward means the direction from which the wind is blowing, and leeward means the direction to which the wind is blowing. The word *lee* means shelter, and comes from the Anglo-Saxon word *hleo*. The lee side of a ship is the sheltered side. There are two other words that go together in nautical language. They are *starboard* and *port*. The words used to be *starboard* and *larboard*, but these were too much alike in sound, and there were accidents because sailors sometimes misunderstood orders, so the word *port* was adopted and is used instead of larboard. The rudders of old ships were frequently a little to the right side of the ship, and the right side of the ship thus came to be called the *steerboard* or *starboard* side. The left side of a ship was the side where there was no rudder, and it was therefore called the *leerboard* or *laer-board* side, *lear* being an Anglo-Saxon word meaning empty. The right and left sides of a ship mean the sides on the right and left hand when we stand on the ship looking towards the bow. The *stern* of a ship is the back part. Stern means steering, so no explanation is necessary as to why the word stern came to be used. The bow of a ship is the front end, and it comes from the Icelandic word for the bow of a ship, or for a shoulder. The *bowsprit* is the name given to the spar which projects from the front of a ship. The word sprit means spar, so that the bowsprit means the spar at the bow. The *catsheads* are two strong beams projecting from each side of the bow. Their purpose is to enable the anchor to be raised and lowered without touching the side of the ship. Why they are called catsheads is now a mystery.



4. A marlinespike.

The *galley* of a ship is the cook's quarters and also the cooking-stove, but it originally referred to a ship that was rowed by oars, which were usually worked by slaves or convicts. It is still used as the name for the large boat used by the captain of a man-of-war. If we have been on board a ship, we must have seen the small boats that are suspended from bent iron posts, that are turned round when the boats are to be lowered into the sea. These bent posts are called *davits*, a word which was originally *Davids*. The reason why they were called Davids is now quite unknown.

The *capstan* on a ship, or on a wharf, is a revolving drum upon which ropes or cables are wound. The anchor is raised, or *weighed*, and lowered, or *cast*, by the help of a capstan. The Latin word *capistro* means "I tie with a halter," and this word traveled to us through France, undergoing changes during the course of hundreds of years until it became capstan. On ships of large size there is always a kind of gutter round the edge of the deck. The water that falls on the deck runs into this gutter, and there are holes through the side of the ship by means of which this water is discharged into the sea. Both the gutter and the holes are called the *scuppers*, a word which comes from French and Latin and means "spitting out."

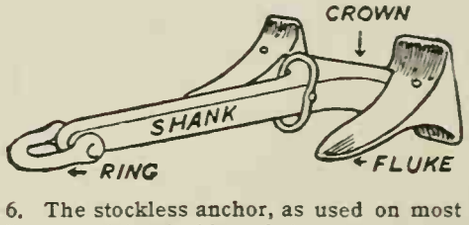


5. A common anchor.

In loading and unloading a ship, the *derrick* is used. The derrick is the hoisting apparatus, and consists of a swinging spar attached to the mast and worked by ropes, as we see in the diagram on page 4618. The origin of the word derrick is gruesome. It was the name of an English hangman about three hundred years ago.

As a package is being hoisted out of the hold, and is suspended from the end of the derrick, it may suggest the work of the man whose name it means. The partitions in a ship are usually called *bulkheads*. They are generally made water-tight, so that a leak may be prevented from flooding the entire ship. Bulkhead means the head or end of a bulk, which, in one sense, is used to mean the hold or hull of a ship. We all know what masts are. The word *maest* in Anglo-Saxon meant the stem of a tree, and, as what we now call masts were made from the stems of trees, it was quite natural that they should be called by their present name. The *rake* of a mast is the distance that it leans backwards. Masts are not perpendicular; they always lean back a little. The Scandinavian word *raka* means "to reach," and the word rake came to be used because the mast takes a slanting position. The word rake is also used to mean the slope of the bow or stern of a ship from bow-rail to keel, or from stern-rail to keel. The *gaff* is the spar attached at one end to the mast and having a trysail attached to it. We see a trysail and gaff on page 3959. The word is supposed to be derived from the Gaelic word *gabh*, which means "take," but it is not clear how it came to be used for the spar to which it is applied. The longer spar at the bottom of a trysail is the *boom*, a word which comes from the Dutch word *boom*, meaning a tree. The *crosstrees* are short spars fixed across the upper ends of the lower masts and top masts, as we see in picture 3. They are used to support the upper rigging. The first part of the word describes the position in which they are placed, and the second part—the word tree—came to be used because they were made from parts of a tree. The *trestle-trees* are other cross-pieces that support the crosstrees. The *cap* is the metal fitting that enables the lower mast to be joined to the upper mast. It is easy for us to understand how the name came to be applied, because the fitting is at the top of the lower mast. The *truck* is the circular piece of wood at the point of a mast, pierced with holes through which the ropes used to hoist flags are put. It is called the truck because of its shape, the word being derived from the Latin word *trochus*, which means a wheel.

Perhaps one of the commonest words we meet with in connection with a ship is *forecastle*, the term applied to the forward part of the upper deck. Generally, the place where merchant sailors eat and sleep is called the forecastle, or, as seamen say, foc'sle. At one time war vessels were built with a short upper deck, that was elevated like a castle to command the enemy's deck. As this was in the forepart of the boat, we can easily see how it came to be called forecastle. Right at the other end of the ship is the *poop*, or deck, built at the stern of the boat. The *poop-cabin* is naturally the cabin directly underneath.



6. The stockless anchor, as used on most liners and battleships of the present day.

Another common word used by sailors and by writers about the sea is *marline-spike*. It is a spike or pointed iron pin used in *marling*, or separating strands of rope as they are being spliced. A *marline*, consisting of two strands loosely twisted, is a small rope for winding around thicker ropes, and comes from the Dutch word *marren*, which means "to bind." See picture 4. There are many hundreds of words used about a ship, and we have been able to consider only a few of them. For instance, the word ship itself came to us from our Anglo-Saxon forefathers, who in their language called it a *scip*, which we have transformed into the word we now use. Then the word *deck* means a cover, and comes from the Danish, where the word is spelled *dek*, and is taken from the verb *dekken*, meaning to cover. The deck is simply the cover of the hull. All these words may refer either to sailing ships or steamships. Every steamship has a smoke-stack, which is also called a funnel.

CONTINUED ON PAGE 4705

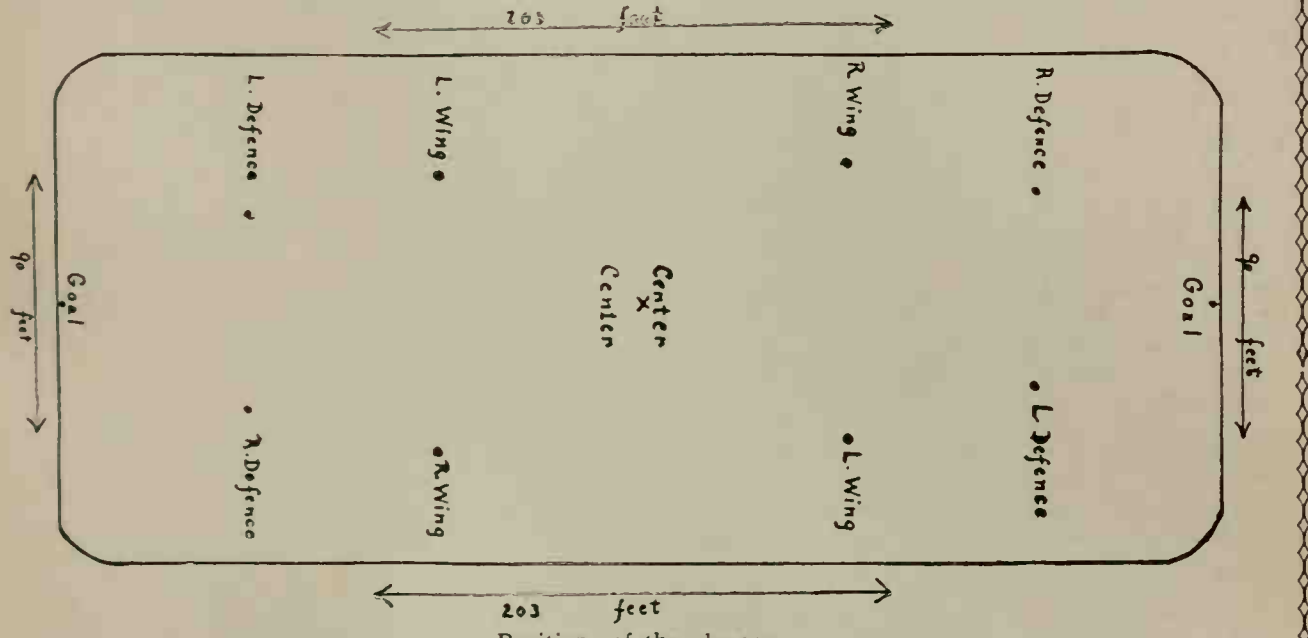
SOME FAVORITE GAMES

ICE-HOCKEY

IN the Old World when we speak of hockey we generally mean field-hockey, but on this continent ice-hockey is the popular sport. Every boy who lives near a skating pond possesses a hockey stick of some kind or another, and he is quite proud of the skill and speed with which it is played in his country. In 1920 Canada won the Olympic hockey championship at Antwerp, the United States came second, and the match between the American team and the Falcons, who represented Canada, was the most brilliant ever seen in Europe. Many of us live in places where the winter is cold enough to provide good ice skating and with the first frost out come our skates and hockey sticks and we want to know the rules which govern the game.

It is played on ice by teams of six men on each side (or sometimes seven, though this number is growing rarer), with a puck made of vulcanized rubber, one inch thick all through, and three inches in diameter. The players are as follows: Goal-keeper, right defence, left defence, centre, right wing, left wing. Hockey sticks are made of wood, must not be more than three inches wide at any part, and not more than thirteen inches long at the blade. In setting the rink the goals should be placed in the middle of each goal line, and should consist of goal nets supported by two upright posts, four feet high and six feet apart, and placed at least five feet from the end of the ice. A distinguishing line should be drawn on the ice between the centre of each goal-post. When the puck passes between the goal-posts from in front and below the top of the net, a goal will be scored, but it will not count as a goal if the puck should strike the cross-bar at the top of the net and bound over. In matches an umpire is stationed at each goal and he informs the referee when a goal has been scored. There is only one referee, and he enforces the rules, decides disputes, controls umpires and time-keepers, and is generally in charge of the field. The goal is tended by the goal-keeper, who must not, during the game, lie, sit or kneel upon the ice; he may stop the puck with his hands but he must not hold or throw it.

The game starts by the referee blowing his whistle after dropping the puck in the centre of the ice between the sticks of two players (one from each team) who face it. The left-hand side of the players who face the puck shall be towards the opponents' goal, and the two players keep the blades of their sticks on the ice until the referee drops the puck. No player is allowed to come within five feet of players facing the puck. The game is then by dribbling, passing and shooting to drive the puck through the opponents' goal. After a goal has been scored, the puck will be faced again in the centre of the ice; when it goes behind the goal line without going through the posts it must be brought out five yards in front of the goal line and there faced. When it goes off the ice at the side it must be brought in three yards and there faced.



Positions of the players.

No one can play ice-hockey without understanding the meaning and importance of off-side. A player is off-side when he is in front of the puck, or when the puck has been hit, touched or is being run with, by any of his own side who are behind him (that is between himself and his own goal). If a player is off-side persistently it is called "loafing" and penalized as a foul. A player who is off-side may be put on-side when the puck has been hit by or has touched any player of the other side, or when one of his own side has run in front of him, either with the puck or having played it when behind him. If a player who is off-side plays the puck or obstructs an opponent the puck must be faced where it was last before the off-side occurred. A player of the defending side will not be off-side when he takes a pass from,

or plays the puck as it bounds off his goal-keeper or the end of the rink or netting.

In playing the game the puck may be stopped with the hand, but not carried or held. No player is allowed to raise his stick above his shoulder or throw it along the ice, nor is any roughness like charging, tripping, collaring, cross-checking, kicking, or pushing, permitted. The referee will rule off the ice, for any time in his discretion, a player who deliberately offends against this rule. If a player makes any unfair or rough play, or disputes any decision of the referee or uses any abusive language, the latter may rule him off for the remainder of the game or for such time as he thinks wise, and no substitute will be allowed. If, further, a player deliberately commits a foul to prevent a score the referee will not stop the game until the play has been completed.

Two and only two substitutes are allowed on each team during a match, and the change may take place at any break in the game made by the referee for that purpose. If more than two players of one side (other than the goal-keeper) have had to retire because of accident the other team must drop a man to equalize the sides. After such a change the puck will be faced again at the spot where it was last played.

With regard to the time: three twenty-minute periods of actual play with ten minutes intermission are allowed for matches, and goals are changed after each period. If at the end of an hour the game should result in a tie the teams change goals and play ten minutes each way or until one side shall have scored within the extra period. If at the end of twenty minutes the score is still even, the match is considered a draw.

The game is rapid and strenuous. It calls for strong skating ability to make short stops and swift turns to the right and left, and good stick work. It demands endurance, swiftness of judgment and unselfish team work. To play well a boy must be fit and enthusiastic. The fire-snuggler and the luke-warm have no place on the hockey rink, yet there are few games which fill keen players and spectators with greater exhilaration.

Canadian hockey is probably the finest in the world. In skill, speed and strength players from the land of the maple have yet to find their equals. In the Dominion as in the United States the game is played by both amateurs and professionals; there are many leagues of both, and the rules for the latter differ only in a few minor points such as penalties for fouls, and the definition of off-side. In 1921 Canada held the world's championship for both the amateur and professional games, the honors belonging to Toronto University and Ottawa Hockey Club respectively.

"CURLING"

"SCOTLAND'S ain sport," the roarin' game of curling, has been popular there for three centuries at least. At first very rude implements were used—random boulders out of the bed of a stream perhaps, which were bored through to let in the thumb of the player. In the course of years the rough block was succeeded by a beautifully rounded and polished object of whinstone or granite supplied with a convenient handle.

Wherever Scotchmen have journeyed they have taken their game. In Canada curling has been known since 1807 and is to-day played from the Pacific to the Atlantic and from the International Boundary to the Yukon. It was introduced into the United States in the early forties, and some twenty years later the Grand National Curling Club was formed. The members used on frosty afternoons to gather for a couple of hours' bonspiel on a stretch of water in New York, running where Canal Street now stands. The spread of the city drove the curlers further north, and all the big matches now take place in Van Cortland Park.

In the Canadian Northwest the sport is controlled by the Manitoba Association, which consists of over a hundred curling clubs. In Winnipeg every winter there is a monster bonspiel and curlers come from East and West. In the early days of Scotch settlers in the West, men curled with wooden blocks which were soaked in water for months and then allowed to freeze hard. Iron "stones" are sometimes used in Quebec as being less affected by change of weather. For the most part, however, granite stones which have been quarried are played with, and these are named after the places whence they come, Ailsa Craigs, Burnocks and Crawfordjohns being some of the best known varieties.

Perhaps you have watched your fathers or uncles curling? The game is very like bowls played on the ice. The rink is marked out of the ice, which should be hard and smooth. To keep it swept every curler carries a broom and good "sooping" or sweeping is a part of the curler's art. It is practised subject to strict rules and under the direction of the "skip" or captain, and you can see how the progress of a stone might be otherwise arrested by the ice-dust caused by the play. Apart from the broom the roarin' game requires no other implement than the stone, which must not weigh more than forty-four pounds, unless it is made of iron, when it must not be more than seventy pounds.

The rink measures 42 yards long and 10 yards wide. Each side has four players and each plays two stones. The "lead" or first player takes his position on the crampit or iron foothold at one end and throws his stone as near to the tee as he can. Then the lead of the other side plays, and instructed by his skip will either try to drive away the first stone, if well placed, or get a better position for himself. When the skip's turn comes he is directed by another player. When all sixteen stones have been thrown the players cross to the other end of the rink, count the scores, and play the next "lead" or innings from that end.

If a stone does not cross the hog-score it is a hog, and is removed from the rink unless it has struck another stone lying over the hog. Stones that pass the back-score or touch the swept snow on either side are

also removed. There is a great art in throwing the stone: by a cleverly imparted twist a stone may be made to curve round a guard and drive away a winner or find a good lie for itself. When the skip calls for "in turn" or "out turn" the good player is always able to respond and to make the stone curl against the natural fall or bias of the ice.

The sweeping is highly important. It is for a skip to say whether a stone should be swept or not. The players, other than the one playing his stone, should be always ready to sweep wherever directed to do so, and must keep beside or slightly in front of the stone until it reaches the house (as the circle is called) if it goes so far. They should sweep with alternate strokes so as not to interfere with each other, and across the rink. They must not touch a moving stone with their brooms.

When chittering birds on flickering wing
  About the barn doors mingle,
And biting frost and cranreuch cauld
  Drive coofs around the ingle,
Then to the lochs the curlers line,
  Their hearts as light's feather,
And make the tee wi' mirth and glee,
  In cauld, cauld, frosty weather.

LACROSSE, THE NATIONAL GAME OF CANADA

WHEN the white man and Indian came into contact upon this continent each found much to interest him in the other's ways. Modes of living and fighting were very different, but means of enjoyment and recreation had points of resemblance. Men hunted in the New World as in the Old; they danced and magicked, they played games, they feasted and held great councils. The weapon and the measure, the implement and the fare may differ, but, in the main, man the world over takes his pleasure along similar lines. It is for this reason that many of the games which we play to-day have come down to us from far distant times and such diverse races.

The first settlers found the Indians of many tribes playing a game with a curved wooden stick and a rude ball made of hide stuffed with hair, a piece of bark or the knot of a tree. As many as six hundred to a thousand men participated and the game was taken so seriously as to be prefaced by a ceremonial dance. The goals were sometimes rocks or trees, sometimes a single or a double pole. They were placed from five hundred yards to half a mile apart with practically no side boundaries. When the dance ended the ball was tossed in the air and the two sides rushed to catch it on "crosses" similar to those used now. According to local custom the ball had to pass a rock, strike a pole or pass between the poles. The medicine men were umpires and the players decked in paint and feathers were urged to further desperate effort by the squaws who beat them with sticks.

The early French settlers became much interested, and the name "lacrosse" was given to the game because of the curved stick with which it was played. A piece of treachery, which recalls the early days of Rome and the theft of the Sabine women, was committed by the tribe of Ottawas, under cloak of their favorite sport. In 1763 Chief Pontiac came to the British garrison of Fort Michilimackinac and invited the soldiers to attend a game of "baggataway." Now the garrison was "en fête" to celebrate the birthday of their king and, unsuspecting, the commander gave leave for his men to go. During the game the Indians worked their way closer and closer to the gates; then suddenly from under their blankets the squaws produced tomahawks which the braves seized, threw away their sticks, and brandishing their weapons rushed into the fort and massacred all save a few Frenchmen. Just over a hundred years later and shortly after Canada became a Dominion, lacrosse was recognized as the national game and the National Lacrosse Association of Canada was formed. Canadian and Indian teams visited England and made the game popular there, and sometime during the early seventies it was introduced into the United States where it is mostly played by some of the colleges.

The rules are not difficult. The crosse, usually five or six feet long, must not be more than a foot wide. It is crooked at the end so as to allow of a loose net of cat-gut being stretched across it. The ball of solid india-rubber weighs six ounces and should measure eight inches around. Goal-posts consist of two poles six feet from the ground when set up and joined by a cross-bar. A netting extends back of the goal-posts for seven feet where it is pegged to the ground. The goal-posts should be placed 110 or 125 yards apart, and a goal crease marked in white chalk, twelve feet square. The goal crease is important because only a player who has the ball may enter it, for the purpose of scoring a goal. No player is allowed inside merely for checking. A goal is scored by a player putting the ball in the goal net from the front. The goal-keeper, while defending his goal within the crease, although not allowed to catch and throw with his hands, may put away with his hands or block the ball in any manner with his stick or body.

Twelve players make up each side. They are as follows: Goal-keeper, point, cover-point, first defence, second defence, third defence, centre, third home, second home, first home, outside home and inside home. In each position save that of goal there are two men, one on each side, whose duties are to mark and neutralize one another's efforts.

The game is started by the referee placing the ball in the centre of the field between the sticks of the players facing, the players having their left side towards the goal they are attacking. At the word "play" the crosses are drawn in towards the holders of them. The ball comes to one or the other and the players of the two teams at once begin a struggle for the possession of the ball. When scooped up from the ground it is carried horizontally on the stick, the player running towards one of the goals

and endeavoring to elude his opponents, being helped on by his own team. Although the ball may be thrown for a long distance, long throws are not often tried, it being generally better for a player to run with it until he can pass it to a member of his side who proceeds with the attack, either by running, passing to another, or trying to throw the ball through the opponents' goal. There is no off-side and a pass may be made to front, side or rear. No player may charge another, touch the ball with his hands, persistently throw the ball out of bounds or strike or trip another player with his crosse.

The playing time of a match is divided into four periods of twenty minutes each, actual playing time, ends being changed at the conclusion of each period. A ball out of bounds must be "faced" at the nearest point where it left the bounds, and all the players must remain in their places until the ball is faced. The ball, however, must not be faced closer to the goals than ten yards in any direction.

A free throw is given for a foul. By a free throw is meant that the player fouling and the one fouled are placed in the same position as they occupied immediately previous to the foul, the player fouled having the ball on his crosse. At the word "play" each is allowed to move in any manner allowed by the rules of the game.

CRICKET

CRICKET is played with bats, ball and wickets by two sides of eleven players each. The batsman defends his wicket against the ball which is bowled by a player of the opposing side, and the other players of this side are stationed about the field in order to catch or stop the ball. The score is reckoned by runs and the side which scores the greatest number of runs wins the match. Each side has two innings taken alternately.

In the centre of the field the wickets are pitched opposite to each other, and distant from one another 22 yards. A wicket consists of three stumps of wood, so pitched that with the space between them they cover eight inches; on the top of the stumps are two light wooden bails. A bowling crease is marked on the turf on a line with the stumps eight feet eight inches in length. Beyond this line the bowler must not pass when delivering the ball. Four feet in front of the stump is marked the "popping crease" which is the batsman's domain.

Captains of the opposing sides toss for choice of innings. The team which bats first sends two men in, one to each wicket, and generally chooses men with strong defensive powers and good nerve. Then follow the most brilliant run-getters, and the weakest batsmen go in last. The other team sends a bowler to one end and a wicket-keeper to the other and disperses the other nine men about the field in such positions as the kind of bowler and kind of batsman seem to require. The umpire then calls "play" and the bowler bowls from the end opposite the batsman. If it is a ball which the batsman can reach he either blocks it or hits it to some part of the field. If he thinks he can run to the opposite wicket, the other batsman changes places with him and a run is scored.

The bowler bowls generally six balls consecutively from one end, then a different bowler bowls one over from the opposite end. At the end of every over the fields "change over." An over from which no runs are made off the bat is called a "maiden."

There are nine ways in which a batsman may be out. The following five are the most important.

(1) Bowled out, if the bowler when bowling hits the wicket and dislodges the bail.

(2) Caught out, if the ball after touching his bat or hand is held by any other member of the other side before touching the ground.

(3) Stumped out, if the wicket-keeper dislodges the bail with the ball when the batsman is "out of his ground."

(4) Out leg before wicket, if he stops with any part of his person, other than his hand or arm below the elbow, a ball which the umpire thinks would have hit his wicket.

(5) If a ball is dislodged by the ball sent in by a fieldsman when neither batsman is in the popping crease or has his bat in the crease, the nearer of the batsmen to the wicket so put down is "run out."

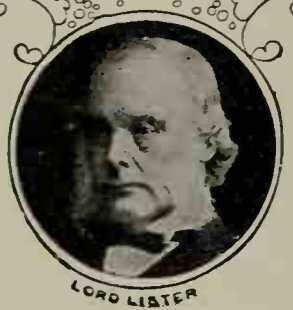
A batsman may also be out if he hits his wicket, handles the ball, hits the ball more than once with intent to score, or obstructs the field. Besides runs made by the batsmen there are "extras" consisting of "byes," "leg-byes," "wides," and "no-balls." The two former are run out if the ball goes past the wicket-keeper, the two latter are given by the umpire. A wide is when the ball passes the batsman beyond the limit of his bat; a no-ball is when the bowler delivers the ball without having either foot behind the bowling crease, or if he jerks or throws the ball instead of bowling it. A bye is a run made off a ball which touches neither the bat nor the person of the batsman, a leg-bye is made off a ball which, without touching the bat or hand, touches any other part of his person.

One of the first things a boy must learn is to play with "a straight bat" when defending his wicket against straight balls. A beginner as a rule holds the bat sloping outwards from the handle to the point, and then the rise of the ball is apt to carry it clear of the blade. Then his next concern is to calculate accurately the pitch of the ball. The bowler will try to pitch the ball too far for the batsman to reach out to meet it at the moment it touches the ground or immediately it begins to rise. He will furthermore pitch it too near the batsman for him to wait till after it has reached its highest point before playing it. The batsman then is compelled to play the ball in the middle of its rise and is apt to miss it or send it up in the air with the danger of being caught out. The bowler tries to pitch balls too short for safe forward play and too long for safe "playing back." The batsman plays forward or back as his judgment tells him, and is ready when he receives a bad length ball or one safely wide of the wicket to hit it clear of the fieldsman.

THE NEXT THINGS TO MAKE AND DO ARE ON PAGE 4705.

THE WORLD'S GREAT DOCTORS

CONTINUED FROM 4555



NO lives have been more important to the well-being of the world than the lives of the great surgeons and physicians. Without these men the human race must have been very much reduced by the many diseases fatal to man. Even to-day, in spite of science, pestilence carries off millions of people every year in India and elsewhere. But for the skill of the doctors, similar conditions would prevail throughout the world. If North America had a death-rate as high as that of India, the land would be an empty wilderness in the course of a few years, as the birth-rate on this continent is smaller than in India. Our doctors not only cure us when we are ill; they teach us to observe laws which, if followed, will, generally speaking, keep us in health.

There never was a time in the history of man when there was no attempt made to heal wounds and diseases. We have no written books to tell us about the doctors of the old-time peoples, but, nevertheless, the story is written for us in bones of men that have been found. Remains of men who lived thousands and thousands of years ago show us that many of these men sustained dreadful injuries, and that the doctors of those times cured their hurts. Skulls have been discovered from which damaged bone had been removed and new bone put in. A surgeon is able to tell whether the operation was successful. He finds the new bone knitted to the old, and knows that the surgeon succeeded in his task. We find not only broken heads that have been cured, but bones which show that injured arms and legs were cut off by rough flint implements, and were healed in spite of the very crude treatment they received. But we find many other examples of operations which were not successful; the unknitted bone shows that the patient died, in spite of the attempts of his doctor.

What a wonderful story of the past these signs tell us! Men were savages, living by battle with one another. Their lives must have been desperately hard and cruel. Injuries to bones which we are able to say were those of women show that the women of savage days shared the battles of the men, and were hurt as badly. The men and women fought for their flocks and herds, their pastures, their watering places, the caves in which they lived. In these fights they inflicted and received terrible injuries from arrows and spears of flint, from hatchets of stone

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and from fragments of rock which were thrown at them.

But the old-time savage man had some tenderness in his heart. He set the broken bones of his wounded kinsman, and the woman nursed the stricken warrior. For months, while injuries to head or limbs were healing, they had to feed and nurse the wounded, and this they did, as we know from the signs which show that the injured recovered.

All this surgery was very rough and clumsy, and many, many centuries were to pass before men became skilful. Until quite recently it was supposed that surgery proper began with the Egyptians. But the marvelous discoveries in Crete, which tell us of a wonderful civilization there, of sea-power and of military feats which gave the Cretans a vast empire thousands of years before the birth of Christ, remind us that there must have been accomplished surgeons and physicians in that land long before surgery was supposed to have been known in Europe, and even before it was known in Egypt.

We must, however, go back to facts of which we are certain. Let us for a moment clearly distinguish between medicine and surgery. Surgery means the treatment and cure by operations of injuries to the body. The repair by medicine was largely superstitious practice—charms and incantations and all manner of nonsense. In surgery, however, they did remarkable things considering the state of knowledge at the time. There exist papyrus documents, dating from 3,500 years before Christ, from which it is plain that at that time it was a common thing to practise quite difficult surgical operations; and surgical instruments have been preserved which were made in very early times in Egypt.

MOSES, A GREAT DOCTOR OF EGYPT, AND HIS WISE LAWS OF HEALTH

The first great doctor in Egypt was not one of the sorcerer surgeons of the Pharaohs, but Moses, the great Hebrew leader. He did not cut off diseased limbs, nor did he with his own hands make medicine for the sick. But he had a wonderful knowledge of the laws of health, and made the Israelites follow a code of regulations for their cleanliness and well-being, which preserved them in health and vigor for the forty years of their wanderings in the wilderness, and remained a heritage of health to the nation afterwards.

If the splendid laws for health which Moses drew up, fourteen centuries before Jesus was born, could be enforced in our days in the cities and in all the lands over which the Stars and Stripes fly, they would save thousands and thousands of lives every year. There was no mystery about his methods. His laws, which are written in the Old Testament, are plain, sane rules of matter-of-fact science.

HIPPOCRATES, "THE FATHER OF MEDICINE"

After Moses, the first great doctor whom we can name is the great Hippocrates, who was born about 460 years before Christ. Hippocrates, who was a Greek, was born in the island of Cos, off the coast of Asia Minor, which is famous as the birthplace also of Apelles, the great painter. For many generations his family had practised medicine, and the people's attitude towards them gives us a curious insight into the mind of the time.

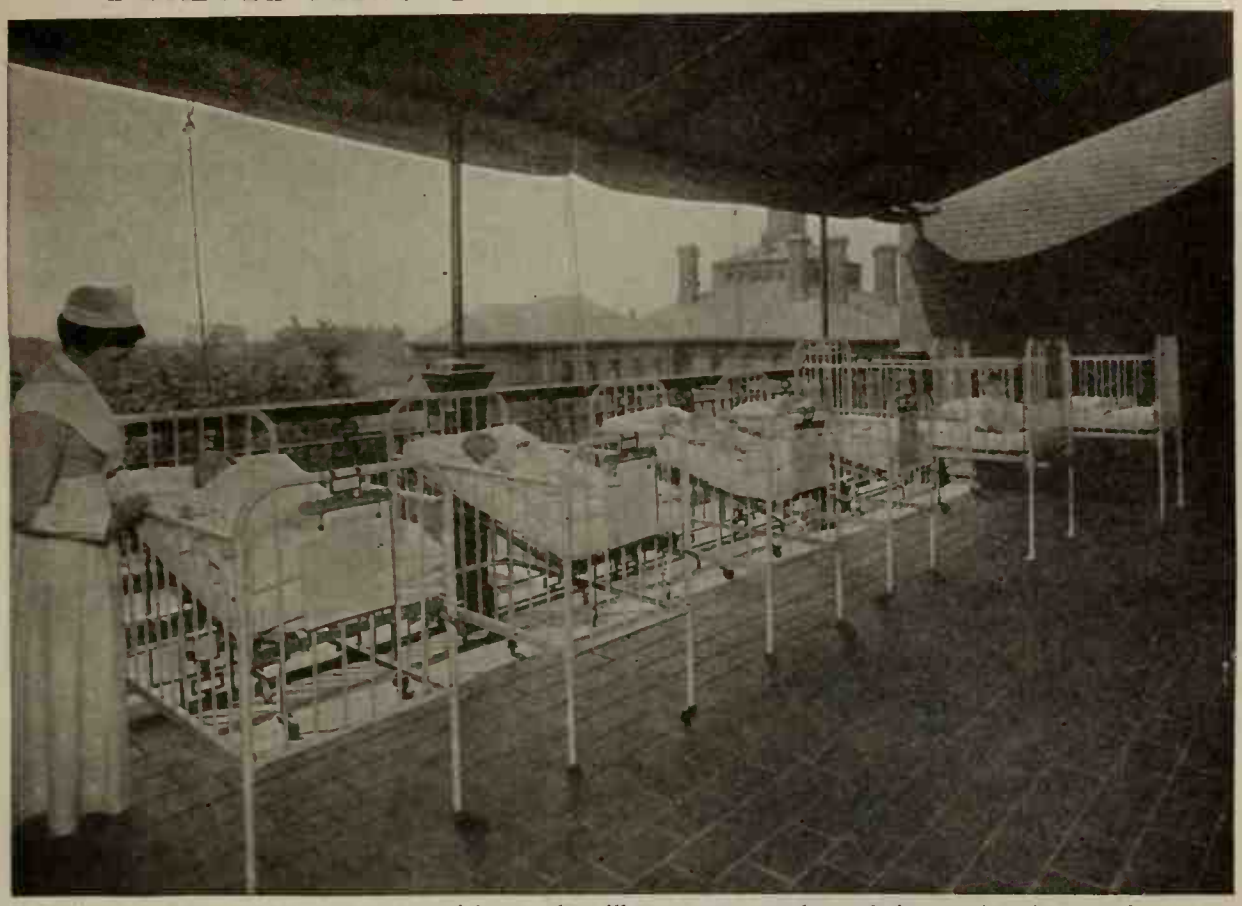
It was believed that they were descended from Asclepias or Æsculapius, who, Homer says, was a skilful physician, and whom the Greeks revered as a god. Hippocrates became a physician-priest or priest-physician of Æsculapius, as the rest of his family before him had been. The temples of Æsculapius were carefully chosen to get the fullest measure of sunlight, pure air and water and shelter from cold winds. Within the building was the temple proper. Without were porticoes, which formed what we should now call hospital wards, and there sick people prayed to their gods, and were treated for their ailments by the priests.

OLD DOCTORS WHO KNEW NOTHING ABOUT THE WORKING OF THE BODY

So far no man knew anything about the action of the human heart, about the motion of the limbs, about the action of the lungs, about the process of digestion, or about the manner in which heat is maintained in the body. Naturally, then, treatment was very simple. Not understanding the working of the human body, they could not have any clear idea as to the illness from which a patient suffered. To treat a disease under these circumstances, is, of course, practically impossible. Hippocrates altered this greatly. He studied hard, and introduced a new and great system.

When a person was ill, Hippocrates carefully observed the progress of his illness. He saw that persons suffering

FRESH AIR CURES YOUNG AND OLD



The care of children when they are sick, so that illness may not hurt their growing frames, is a most important part of the work of our hospitals. This is a picture of an open air ward in Johns Hopkins Hospital, where sick children are nursed back to health. See how carefully the cots are placed so that the light shall not hurt the children's eyes. You can see that in spite of illness, the children are happy.

Doctors have discovered that the best way to cure the "white plague" is to keep people who are ill of tuberculosis in the sun and air. Therefore the City of New York has built this pavilion on an island in the river. The poor people of the city in the first stages of tuberculosis are sent here, and every effort is made to nurse them back to health and strength. Photographs by Brown Bros., New York.

from similar illnesses were affected in the same way. Therefore, by observing the ordinary course of the disease, he was able to predict what would happen, to prepare for the stages which were to follow, and to be ready to grapple with every new feature of the illness. He made careful notes of the diseases that came under his care, and is the first physician who is known to have left records of the progress of his patients to guide the study of those who came to him for instruction, and who followed his principles after his time.

Before he began to teach doctors had been mere blundering machines; Hippocrates made them observant, thinking, skilled men. Of course, there was more in his system than this, but the youngest of us can see that to have done even so much was an important fact in the history of medicine.

THE GREAT WORK THAT HIPPOCRATES DID FOR ALL MANKIND

Many zealous students gathered about Hippocrates to learn his ways and carry out his laws. He made them all take a solemn oath to respect their teacher as a father, to share their knowledge freely with their fellows, to behave with stainless honor and never to divulge a secret learned in the sick-room. This oath is still respected by all good physicians of our day, and Hippocrates' name is held in honor by the members of his profession. He died some time between 377 and 359 B. C.

His writings were a great gift to the world, although men were not then wise enough to understand all that he really had done for the cure of the human body. One of his discoveries was that the course of certain diseases may be traced by listening to the sounds in a patient's chest. It took 2,000 years to make that knowledge really useful, and then Laennec, a doctor in Brittany, invented the stethoscope, an instrument which every doctor now carries, because it enables him to hear the beating of the heart and the movements of the lungs.

The work of Hippocrates was followed up at the great school of learning at Alexandria, but men broke away from the sound science which he had taught, and drifted into mysteries and folly. Not until the time of Galen was there a return to sound teaching.

Galen, who was also a Greek, and lived to be an old man, was born at Pergamus, in Asia Minor, in 130 A. D. He studied at home, and afterwards at Smyrna, Corinth and Alexandria. His close study of physiology and his clear reading of the teachings of Hippocrates made him famous as a physician. He practised for a time in Rome, where he was far ahead of all his rivals in knowledge and in skill. They hated him for this, and managed to have him driven from the city. Some people say that in his later years he went back to his native place and died there in the year 200 A. D., while others maintain that he went to Sicily and lived there until the year 210 A. D.

HOW GALEN TAUGHT THE DOCTORS OF EUROPE FOR A THOUSAND YEARS

Galen gathered together all the safest teachings of those who had gone before him, and added to these the results of his own observations, and for a thousand years the teachings of Galen were all that Europe had to go upon in the science of curing disease.

It is wonderful to-day to see how much he knew, and yet how much he did not know. To those who had gone before, the nerves were mere mysterious tendons. Galen learned that the nerves are the telegraph wires of the brain, and that without them there is no feeling. Other men had been mystified by the muscles, but Galen found that they hold the power by which the work of the body is performed. He knew what the muscles *did*, but he could not tell *why*. "The limbs of animals have weight," he wrote, "and, like other heavy bodies, they tend to fall to the ground. Why is it, then, that they are able to move in every direction?"

Galen was the first man to judge of health by the pulse of a patient, yet he did not understand that the pulse was affected by the action of the heart.

Galen knew nothing about chemicals. All his medicines were made up of vegetable matter or animal matter. One prescription of his for a serious form of illness consisted of powdered snails, galls, and pepper! Still, it was not his actual prescriptions, but the great laws that he made, which were so important.

HOW THE ARABS TREASURED UP THE WORKS OF THE GREAT DOCTORS

Unfortunately for mankind, Galen's laws were not generally observed. In the centuries during which the Roman Empire was slowly breaking up, Hippocrates

GLIMPSES OF TWO GREAT HOSPITALS

Bellevue Hospital in New York found that many poor people in the city could not afford carriages to take them to the hospital when they were sick. Therefore, the hospital began to send a conveyance called an ambulance for patients who were very ill. The idea soon spread, and ambulance services are now found in all cities. The picture gives a glimpse of Bellevue Hospital, which is one of the largest in the world.

Fordham Hospital, one of the newest hospitals in the United States, is built on a beautiful open driveway in the Bronx, a populous and important borough of New York, where about three-quarters of a million people make their homes. A hospital such as this, where patients are nursed in large, airy wards, in surroundings of exquisite cleanliness, is a great advance from the times they were shut up in close, airless rooms.

and Galen were almost forgotten by Europeans, but the Jewish and Arabian physicians treasured the works of the two great men. Their writings were translated from the original Greek into Arabic, and later again into Greek and Latin, and it is small wonder that in the end the works became too complicated to understand or so incorrect as to be worse than useless. Physicians in the Middle Ages were generally superstitious, and it was not until modern times that they really began to understand the laws of health.

We must not think, however, that in all these years no work was being done in surgery or medicine. Remnants of the learning of the great Greeks lingered long in Greece and Italy. In fact we may say that its feeble light never really died out, but was swallowed up in the brighter flame of the new learning of the Renaissance.

Some famous schools of the middle ages

As early as the ninth century, when Alfred the Great reigned in England, we find records of a famous medical school at Salerno in Italy. In the eleventh century the teaching at this school was in the hands of the Arabian physicians of whom we have just spoken. It is said that William the Conqueror journeyed to Salerno to be cured by them.

As the desire for learning spread, universities grew up or were founded, and most of them included schools of medicine. By the middle part of the thirteenth century the universities of Bologna, Padua, Rome, Pavia and Montpellier were famous for their medical schools and to these schools doctors flocked from other parts of Europe, to study at these universities, just as in our own time men have gone from America to Europe, and it is interesting to learn that women were admitted to them, and were more than once either professors themselves, or assistants to the professors.

William of Salicet, a great Italian physician, wrote about wounds. His pupil, Lanfranchi of Milan, who taught at the University of Paris, and was a greater man than he, wrote about the difference between hemorrhages, or bleeding, from the veins and from the arteries. He was followed by Guy de Chauliac, a Papal physician who performed many dangerous operations, and wrote a great book on surgery, which has never been forgotten since his time. This great man taught at the University of Montpellier.

After de Chauliac's time, the first great names we come to are those of Paracelsus, a Swiss, who is best known as a writer on medicines, and Ambrose Paré, a French surgeon. Paré was born near Laval at the beginning of the sixteenth century. He joined the French army as a surgeon, and proved himself a man of entirely original mind. In the wars he showed himself to be as merciful as he was skilful. He sought not only to heal men of their wounds, but to heal them by the tenderest means. He learned how to tie up the arteries which had been cut through, and so to stop the bleeding. He greatly improved the treatment of wounds caused by gunshots by using cold oil in dressing them, instead of the boiling oil that had hitherto been used. In many ways he improved surgical practice, and taught Europe his methods by writing of his discoveries, so that all who wished might read.

Paré studied at Paris, which had long been noted. Padua was still famous, however, and it was to this school that Linacre, who was afterward physician to Henry VII of England, went to study. Linacre, however, is not remembered for his learning in the science of medicine, though that is said to have been great, but because he founded a college for physicians in England. John Caius, physician to Queen Mary of England, was also a student at Padua. He is remembered as the founder of Caius College at Cambridge.

A much greater man than these two was Andreas Vesalius, who was born in the city of Brussels in the year 1514. He studied at the University of Louvain, and afterward at Montpellier, Paris, Venice and Padua. He taught and wrote much, and was brave enough to attack the writings of Galen that had been followed so long. Later he became physician to Charles V, a position his father had held before him. After the death of Charles, he was asked to become professor of anatomy at Venice; but was drowned on his way back from the Holy Land, to which he had made a pilgrimage. He is honored by physicians as the founder of a great deal of the modern knowledge of anatomy, and especially of the structure of the human brain; Fallopius, who was one of his pupils, and a great man named Eustachius, are also men of about his

time who are well known in the history of medicine.

William Harvey, Discoverer of the Circulation of the Blood

In spite of all that these men did, however, there was still great ignorance of the working of the human body. Up to the beginning of the seventeenth century all the doctors who studied anatomy, that is, the structure of the body, were as much puzzled by the flow of blood, and the heat of the body, as we should be by the motion of a motor car if we knew nothing of the working of the engine which draws the car.

Something had been learned, however. In the time of Vesalius, Servetus, a Spanish physician, discovered that the veins have valves which force the blood in a certain direction. Servetus was followed by Fabricius of Acquapendente, a professor at Padua, who learned a great deal about the circulation of blood in the lungs. Then came William Harvey, who showed that it is when the heart contracts that it does its work, that it is then that it sends the blood to all parts of the body. Some men had already come near this truth, and some Italians say that Caesalpinus, one of their noted doctors, had discovered it before Harvey. This, however, is not believed to be true. It is generally believed that Harvey made his discovery quite independently of anything that Caesalpinus may have done, and those of us who read the story of the telephone can easily see how two men may make a discovery without either knowing of the other's work.

William Harvey was born in Folkestone in England, in 1578, and went first to Caius College at Cambridge, where he took his bachelor's degree. Then he determined to study medicine, and as the Italian schools were still far in advance of any of the English schools, he turned his steps to Padua, where he won a doctor's degree. From Padua he went to Bologna, and to Pisa, and then having gained all that Italy had to teach him, he returned home.

All this time he had been studying the problem of the circulation of the blood, to which it is probable his thoughts had been turned by Fabricius. After he went back to England, he continued his studies, and in 1616 was able to announce his discovery of the circulation of the blood.

It was a great discovery. There is no doubt that Harvey knew of its greatness, yet he made his first announcement simply and modestly in a lecture to a class of only a few students in London. When the older doctors heard of it, some of them denounced him fiercely, but he lived to see his discovery believed in by all. Some years later, an Italian named Malpighi discovered the capillary veins and thus completed Harvey's work

By this time much had been learned of the human body and its working. As we have seen, there were in every century great and learned men in the medical profession. But toward the end of the Middle Ages, the practice of surgery fell largely into the hands of men who were called barber-surgeons. In other words barbers were often called in to do the practical work of operations. Physicians and surgeons who were in attendance on sovereigns, and a few who were noted for their learning, were looked up to and respected, but the great number of doctors were still ignorant and superstitious.

Physicians of the Seventeenth and Eighteenth Centuries

This state of things, however, began to change in the seventeenth and eighteenth centuries. Much was done in Holland for medicine by Hermann Boerhaave, who was born near Leyden in 1668. He was not only a physician but a chemist and botanist, and was, therefore, able to teach the real nature of some of the medicines used. He taught his students not only from books, but made them study diseases at the bedsides of patients, so that before they began to practise as doctors, they might themselves know from experience the nature of the illness they undertook to treat. In England the change was largely due to the work of two brothers, William and John Hunter, who were born in a little town in Lanarkshire in Scotland. William Hunter spent five years in the University of Glasgow and afterwards went to London, where he became a surgeon. John Hunter studied with his brother William and in the great London hospitals. He was an army surgeon for a time, but later settled down in London, and devoted himself to the practice and teaching of his profession and the study of anatomy. He paid special attention to comparative anatomy, or the structure of the bodies of various animals as compared with one another and with man. This study is very important

and through it many of the great discoveries have been made.

EDWARD JENNER, WHO DISCOVERED VACCINATION

One of John Hunter's pupils who became famous was Edward Jenner, the discoverer of vaccination. He was born at Berkeley in Gloucestershire, England, in 1749. After his training under Hunter, he settled down in Berkeley, and there for years he studied the subject of vaccination for smallpox.

He believed and hoped that by spreading vaccination throughout the world, smallpox would be entirely stamped out of existence. At first his theory was hotly opposed and there is still opposition, but, after a year, more than seventy of the leading medical men of London signed an article declaring their faith in it. News of the discovery was carried throughout the civilized world, and Jenner received very many honors, while Parliament gave him $150,000. He died in his native village at the age of seventy-three.

While, as was said above, there is opposition to vaccination by people who do not think it wise to introduce sick matter into a well body, the defenders of the practice point to the fact that in former days there were epidemics of smallpox which swept away thousands and made the people go wild with terror. Now no one fears smallpox very much and deaths are less frequent. Jenner also taught the difference between typhus and typhoid, and curiously enough, people who are now likely to be in danger of infection from these latter diseases are vaccinated also.

THE LONG SEARCH FOR SOMETHING THAT WOULD BRING SLEEP

After such advances in surgery had been made that important operations could be performed, surgeons began to look for some drug that would enable them to put their patients into a deep, quiet sleep, during which they would feel no pain. This is what doctors call "*producing anæsthesia*" and it is only when anaesthesia is produced that a patient can stay quiet enough to let a surgeon do the wonderful things to which in our day we have become accustomed.

In the early nineteenth century, such men as Dr. Ephraim McDowell, of Kentucky, had performed serious operations, while the patients were conscious of pain, but never except when the doctor saw that, without an operation, the patient would quickly die. You can see, therefore, how important an "*anæsthetic*" is, and that is why for a long time the thoughts of men of science had been turned toward finding this blessing to mankind.

The writings of the Greeks seem to show that they knew of some drug the use of which made people unconscious of pain, and it is said that a famous Italian surgeon of the thirteenth century used a preparation of mandrake for this purpose. Even if this were true, however, the knowledge had been lost, and it was not until the nineteenth century that men succeeded in their search for some substance that would for a time lull the sense of pain to sleep.

The great chemists of whom we may read in other parts of this book showed the way. Sir Humphry Davy, who in his youth began to study surgery, discovered that nitrous oxide would produce anæsthesia, and this gas is still sometimes used by dentists when they have to pull out a painful tooth. A little later Michael Faraday said that sulphuric ether could be used as an anæsthetic. The knowledge thus gained was first used in America.

THE MEN WHO DISCOVERED ANÆSTHETICS

Just twenty years after Faraday's discovery, Dr. Crawford W. Long, of Jefferson, in Georgia, used this gas to enable him to perform a very difficult operation which would have been impossible without it. The importance of what Doctor Long had done did not, however, become widely known, and it is only in this century that he has received honor for his work. He was one of the quiet great men who do much good in their own community, but, perhaps because of the greatness of their humility, lose sight of the importance of their deeds. Meantime the search went on, and in 1844, two years after Doctor Long's use of ether, a dentist named Horace Wells, of Hartford, used nitrous oxide when drawing teeth, but soon dropped its use. About the same time Dr. W. T. G. Morton, of Boston, was working in the same direction, and it is to Doctor Morton that the chief honor of discovering anæsthetics is due.

He was a New England boy, who was born on a farm near Charlton, in Massachusetts. He played and worked on the farm, and went to a country school, and

later on to an academy. When he was twenty-one he went to the Baltimore College of Dental Surgery. Two years later, he graduated, and went to Boston, where for a time he was in partnership with Doctor Wells, who afterward left him and went to Hartford. He soon saw that he needed greater knowledge of the human body than he possessed, and he began to study anatomy, while at the same time he continued to experiment with one substance after another in the effort to find a good anæsthetic. At length Dr. Charles T. Jackson, a physician who was also a chemist, suggested to him that he should try sulphuric ether. He acted on the suggestion, and was so successful in his experiments that surgeons in Boston began to use it in the Massachusetts General Hospital, in 1846. Other men tried to take the credit of the discovery away from Doctor Morton, but he proved that it was his own, and after his death a monument was erected to his memory in Boston

The fame of the discovery soon spread to Europe, and ether was used in London a little over a month after its first use in Boston. Among the surgeons who quickly saw its great value was Dr. James Simpson, one of the professors at Edinburgh University. But the methods used in giving ether were not then nearly so good as they are now, and Doctor Simpson began to look around for something, the use of which would be safer than ether.

He began to experiment and, with two of his friends, tried many things. He worked for months without success, but at last remembered a little bottle of chloroform which a Scotch chemist had sent him. All the other things that he had received from many chemists had proved unsatisfactory, but the chloroform did the work he needed. He inhaled its odor, and immediately fell into a deep, heavy sleep He had made a most valuable discovery, though it might have been at the cost of his own life. Physicians of to-day know the exact strength of the anæsthetics that they use, and measuring instruments have been devised so that they can tell the exact amount that it is safe to give. But all this is the result of hard work and deep thought. The men who first of all experimented on themselves for the good of others deserve high honor for their bravery. Chloroform in particular was a little-known substance which had been discovered only in 1831 by two French chemists, and analyzed and described by Dumas, another noted French scientist, in 1835.

Doctor Simpson was born in 1811 in the little town of Bathgate, in Scotland, where his father was a baker. At the age of fourteen he went to Edinburgh University, at nineteen he had taken his degree in surgery, and was ready for his degree as doctor of medicine at the age of twenty-one.

When he found this new use for chloroform, he was already well known for his surgical skill as well as his teaching. He at once began to use chloroform in his practice and his success was so great that its use spread quickly. Surgeons and students flocked to see him perform operations, and among them was Dumas, who came to see this most important use to which chloroform had been put.

Meanwhile doctors in America continued to experiment with ether and success followed. So now there were two drugs which would destroy pain. Both are used to-day, though in the United States doctors generally prefer ether when it can be had, while chloroform is preferred in England.

Men have discovered other drugs which produce what is called local anæsthesia. This means that the nerves are prevented from conveying the sensation of pain to the brain, which itself is clear. Some of them, if sprayed upon the skin, freeze the flesh. Others simply paralyze the nerves, as cocaine and eucaine. Others are injected between the vertebrae and prevent sensation from passing along the nerves.

It was now possible for the most delicate operations to be carried out without causing pain, and cases which before had been hopeless became comparatively simple. Such men as Dr. J. Marion Sims, in America, Doctor Simpson, of whom we have just read, and many others, by their skill and knowledge saved many lives. But this brings us to another wonderful example of the way in which Nature drives us on to everlasting learning. The number of operations by surgeons increased greatly, but the number of deaths increased also. The death rate in the hospitals became appalling. For although the operations themselves were quite successful, the effects that followed were often fatal. Wounds which the surgeon's

knife had caused would not heal; scores of deaths followed from gangrene.

GREAT DISCOVERIES BY LOUIS PASTEUR AND JOSEPH LISTER

At first it seemed as if there were no help anywhere. About this time, however, a Frenchman, Louis Pasteur, of whom we read elsewhere, discovered that some of the microbes which swarm everywhere around us cause milk and wine and beer to turn sour. It was a great discovery, and set all the scientific world talking, but just one man saw what it might mean to human life.

This was Joseph Lister, a young hospital surgeon who had been looking already for the cause of the dreaded hospital gangrene. When he heard of Pasteur's discovery, he believed that it gave him the clue to the mystery. With the light that the new knowledge gave him, he began a series of experiments, and was entirely successful in preventing the havoc caused by gangrene.

The stories of the lives of these two men and of most of their well-known successors belong to the story of scientists in medicine, which you will find in another place. There are only a few men whom we must tell about here, and among them are two brothers named William James Mayo, and Charles Horace Mayo.

TWO FAMOUS AMERICAN SURGEONS OF OUR DAY

These famous brothers are the sons of a physician and were both born in the state of Minnesota during the years of the Civil War. Both decided to follow their father's profession, and each, after he took his doctor's degree, settled down in the little town of Rochester, in Minnesota, where their father lived. Like their father before them, they are skilful surgeons, and their fame has spread from their own state through all of North and South America, and to Europe.

The value of their work lies not only in their skill, but in the fact that they are great teachers. Thousands of doctors, large numbers of whom have been practising for years, go every year to the hospital at Rochester, in Minnesota. There these doctors, some of them gray-haired men, refesh their knowledge, and learn new ways, greater skill, and inspiration, from the two quiet brothers who did not seek the fame that their search for knowledge, and insistence on the right ways of doing things has brought them.

PHILIPPE PINEL, WHO BEGAN TO CARE FOR ILLNESS OF THE MIND

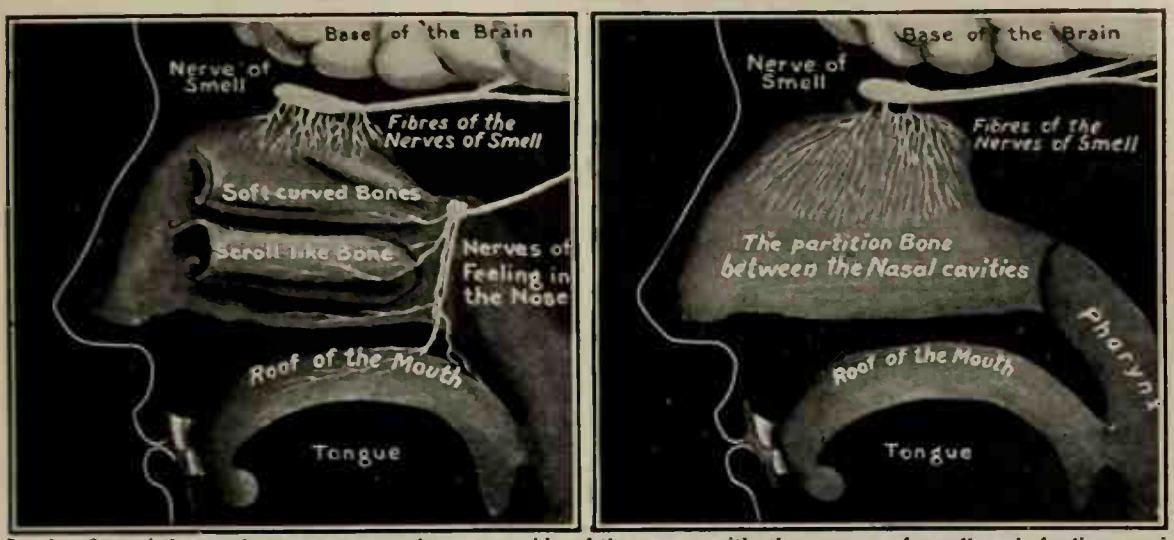
Although efforts were made from the very dawn of civilization to cure illness of the body, little was done until the last century to cure illness of the mind. The Greeks had a glimmering of the true way of caring for sick minds, but the doctors of the Middle Ages had none. If people who were afflicted with illness of the mind could not be cared for at home, they wandered about the country, or were thrown into prison and cruelly treated. Some few were cared for in monasteries and convents, especially at Gheel in Belgium, but the numbers who could be taken in were few and very little could be done for them. The general opinion was that they were very wicked people, and ought to be punished.

This was the state of affairs when, late in the eighteenth century, Dr. Philippe Pinel was appointed physician to the Salpêtrière, an institution in Paris where a large number of these afflicted people were confined. The first thing that he did was to order the chains, with which many of his poor patients were loaded, to be struck off, and with that act of kindness, the proper treatment of mental illness was begun.

Pinel, who was born at the little town of St. Andre, not far from Paris, had studied at the universities of Toulouse and Montpellier, and had already written a book setting forth his views. He continued to study and teach during his life, which ended less than a hundred years ago. His teaching inspired others to follow in his footsteps, and since his time much has been learned about mental illness. It took some time to overcome old ideas, but every care is now taken of patients who suffer from disease of the brain. Doctors give all their lives to the study of mental diseases. Sometimes it is found that an illness can be cured, or that its cause may be removed by an operation or by some special treatment, and a great deal of unhappiness is saved.

The names of the men of whom we have been reading are well known to the world. There are many other famous doctors whose names we cannot possibly give in a few pages. Besides these there are numbers who were obscure, but whose devoted service to the cause of healing helped to advance the science they loved.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 4723.



In the first of these pictures we see the outer side of the nose, with the nerves of smell and feeling, and in the second is shown the inner part of the nose, with the dividing plate of bone between the nostrils.

SMELL AND TASTE

CONTINUED FROM 4257

SMELL and taste are two senses which are of small importance compared with hearing and vision, and we certainly need waste no time in troubling to ask how they may be taken care of; but they are, nevertheless, very interesting.

These two senses are often called the chemical senses. Unlike hearing and vision, they do not depend upon waves, whether in the ether or in the air. We only smell or taste when the thing is actually touching the parts of the body which have this power; we see and hear at a distance, so to speak, but we cannot smell or taste at a distance. When we seem to smell at a distance, particles of the thing we are smelling have been carried through the air to the nose. This fact that smell and taste are so limited in their range makes them inferior to hearing and vision.

Only a very small part of our knowledge of the world in which we live enters by these two gateways of knowledge—the senses of taste and smell. We know that these two senses are in great decline among the higher animals, and especially in mankind. While the senses of vision and hearing have become more important, the senses of taste and smell have become less so. These two senses are closely allied, and they very commonly work together. The taste of such a thing as cinnamon is very like its smell. A very large part of what we usually call taste is really smell. This is true not only of the bouquet, or aroma, of rare wines but also of ordinary articles of diet. We can prove this for ourselves by noticing how differently our food seems to taste when the nose is thrown out of action by a bad cold.

We do not smell with the whole of our nose. Careful study with the microscope shows us exactly with what part of the nose we do smell. Roughly speaking, we may say that it is the roof of the nose and the upper third of it by which we smell.

The rest of the nose is lined by cells which have little projections that wave backwards and forwards and keep the channel clear; but the smell region of the nose is lined by special smell-cells, which correspond to the special cells that we found in the inner ear and in the retina. Each of the smell-cells is connected with a tiny nerve-fibre of its own. We find that this tiny nerve-fibre

really grows out of the smell-cell, which is therefore a nerve-cell that has become changed. This is different from the rods and cones of the retina, or from the special cells in the inner ear, because they are not changed nerve-cells. The difference probably indicates to us how very ancient the sense of smell is, dating back to a time in the history of the body long before so many different cells had been made for so many different purposes as we find nowadays.

THE TWO PAIRS OF NERVES IN THE NOSE, AND THEIR BUSINESS

The nose is supplied by two pairs of nerves coming from the brain. These two pairs of nerves are quite different in their duties. One pair has nothing to do with smell at all, but has to do with ordinary feelings in the nose. Anything tickling, or pricking, or hurting the nose affects these nerves; so does a thing like ammonia, which is irritating, besides having a smell. But this pair of nerves is not affected at all by odors that are not irritating.

The other pair of nerves that come to the nose are the nerves of smell; they are known as the first pair of nerves, because they come off from the brain in front of any others. These nerves are apt to wear out, so to speak, in old age, so that old people lose, in some degree, their sense of smell, just as they often become deaf.

As everyone knows, there is an endless number of possible smells. Naturally, we wish to try to group them in the same manner that we group tastes, but it really is very difficult to classify smells in any way that people would agree upon. A very large number of oils found in plants have rather the same sort of smell, though, perhaps, it is not very easy to recognize any particular resemblance between such smells as turpentine and lavender.

DIFFERENT KINDS OF SMELLS THAT HAVE A FAMILY LIKENESS

Still, on the whole, there is a general family likeness between the smells of plants and flowers; and, when we examine the oils that cause these smells, we find that they are related to each other in their chemical build. There are certain other groups of smells, such as the group to which carbolic acid belongs; and we can learn enough to see that there is a connection between the chemistry of a compound and its smell, but that is about all we can say. It is interesting to notice that electricity can stimulate our sense of smell as it can stimulate all our senses, and the sensation it causes is rather like the smell of phosphorus. It has also been shown that if we take a series of chemical substances which differ from one another in a regular way, their properties of smell also differ regularly.

For instance, there is a long series of chemical substances beginning with marsh-gas. This has no smell—a very unfortunate fact for miners. The next member of the marsh-gas series has a faint smell, and farther on in the list the smells become very strong. It is also noticed that the things which have the most smell are the things, as a rule, which weigh heaviest.

Late last century, Sir William Ramsay, an English scientist, advanced a theory about smell, which is probably nearer the truth than anything else we can say. He thought that the power of exciting smell increases with the size of the molecules of a substance, provided, of course, that it is a liquid, or a gas, and not solid. Hydrogen. oxygen, and nitrogen have no smell, probably because their molecules are too small.

WHAT SMELL DEPENDS UPON AND WHAT TASTE DOES NOT DEPEND UPON

The first member of the series of alcohols has no smell; the next, which has a larger molecule, has a faint smell; and the still heavier alcohols have very decided smells. All this is very far from fully explaining to us what happens when we smell.

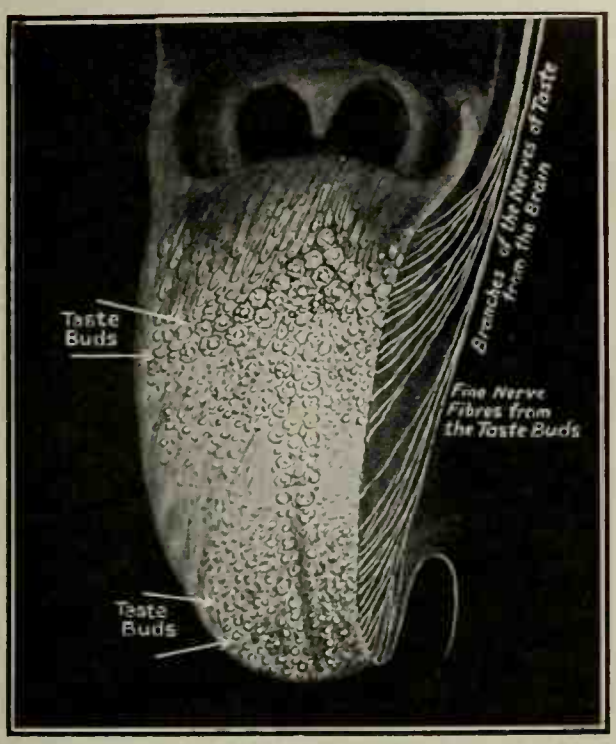
It is interesting to notice that sneezing cannot be excited through the nerves of smell, though it can be excited through the nerves of ordinary feeling in the nose, and through the nerves of sight. Lastly, it is noticed in the case of all the senses, more or less, that they are aroused by *differences* outside them, and soon take much less notice, so to speak, of what excited them very much at first, if it remains the same. This is more striking, perhaps, in the case of smell than in that of any other sense. We have all noticed how quickly we cease to be aware of a smell which at first was perhaps very unpleasant.

The sense of taste resides mainly in the tongue, but does not depend alone

on the tongue. The special cells which are concerned with it, corresponding to the special cells found in the organs of the other senses, may also be discovered on the lower surface of the soft palate, and scattered over part of the throat in front of the tonsils on each side. A person who has lost his tongue does not entirely lose his sense of taste.

As in other cases, special nerve-fibres run to the cells of taste, which are most rich on the back part of the tongue, along the upper part of the edge of the tongue, and at its tip. Taste is much less acute on the front part of the surface of the tongue. We can notice this especially if we place a quinine powder there and then swallow it.

Tastes can be classified much better than smells. Most of them come under the headings of bitter, sweet, acid, alkaline, and salt. The last three of these are probably not pure tastes, but mixtures of taste and ordinary feeling, so they can become painful when they are very strong. But bitter and sweet are probably pure tastes, and, however strong, and perhaps unpleasant, they can never cause such pain as the others do.



In this picture of the tongue the side has been removed to show how the nerves run from the sense organs, or buds of taste, to the brain. The taste buds are grouped at the back and tip of the tongue.

If things are to be tasted, they must be dissolved in a liquid. We do not taste solids, and we do not taste gases, unless they are dissolved in water or some other liquid.

With great labor and difficulty, the nerve-fibres that have to do with taste have been traced from the tongue, palate, and throat to the brain. The curious thing is that there are not separate nerves of taste as there are nerves of smell, vision, and hearing; but the special nerve-fibres of taste run along in other nerves which have nothing to do with taste, and they do so in a most extraordinarily complicated way. We do not yet know what the meaning of this is, but it is evident that in the history of evolution there must have been a very large number of shiftings and changings in the arrangements that have to do with taste. It is certain that, on the whole, both these chemical senses have great uses, far beyond merely being able to let us distinguish between one thing and another. On the whole, they indicate what is harmless or good for us, and teach us what we ought to avoid. There is no doubt about this as regards the sense of smell. Much more important really is the case of taste, which has so much to do with what we eat and what we refuse to eat. It is probable that the sense of taste of a healthy child, rightly brought up, is the best guide as to what it should, or should not, eat.

There are many things which children, or grown-up people if they have not had them before, find unpleasant. We have to make, or acquire, the taste for them, and so we speak of "acquired tastes." It is often true of tomatoes, which few people like naturally. Some of these things may not be harmful, because it may be possible for the body to learn in time how to protect itself from them. But it is possible that no taste is worth acquiring, and that most grown-up people would be healthier if their tastes were more nearly what they were in childhood.

We have now come to the end of that part of our subject which deals with the body, and we have finished by discussing certain well-known facts about the body which are also facts about the mind. Let us now, instead of thinking of one sense at a time, think of the senses as a whole, and then we shall find that this place where we have ended the study of the body is the right place for the beginning of the study of the mind.

THE NEXT PART OF THIS IS ON PAGE 4747.

HOW TARTARIN WENT LION-SLAYING

Tartarin was king of the cap-hunters; he always had a hopeless rag of a cap at the end of a day's sport.

The great Tartarin stood carefully studying the lion from the Atlas Mountains, which sniffed and growled.

About ten o'clock the hero issued forth. "He's a Turk! He's wearing spectacles!" cried the excited beholders.

It would have been better for Tartarin to have faced a lion than this angry old lady with the umbrella

Tartarin's pride speedily had a fall, for he found the movement of the camel worse than that of the boat.

He was received with loud shouts of "Long live Tartarin!" "Three cheers for the lion-slayer!"

A MASTERPIECE OF HUMOR

"TARTARIN OF TARASCON" is one of the merriest tales of the nineteenth century. It was written in 1872 by Alphonse Daudet, the famous French novelist, and made all Europe laugh. Tarascon is a real town in the south of France, and people of that district have a habit of bragging and boasting; telling "tall stories," as we Americans say. It was to make fun of this that Daudet wrote his delightful extravaganza, and a better comic tale has not been written in modern times. He makes us laugh at the absurd lion-hunter, yet keeps a corner for him in our affections, for he never lets us be bored by his Tartarin, or grow out of temper with him. And this means that "Tartarin of Tarascon" is a work of true humor. The further adventures of his hero are the subjects of two more stories, "Tartarin in the Alps" and "Port Tarascon," which well deserve to be read when we have learned enough French to enjoy them.

TARTARIN OF TARASCON

CONTINUED FROM 4439

I REMEMBER my first visit to Tartarin of Tarascon as clearly as if it had been yesterday, though it is now more than a dozen years ago. He then lived in the third house on the left as you enter the town on the Avignon road. It was a pretty little villa, like many others in Tarascon, with a delightful little garden plot in front, a balcony behind, and its walls so whitely painted that they glittered like a mirror in the bright southern sunshine. The Venetian shutters were of bright green; but really there was nothing remarkable about the outside of the house. Inside, it was a very different story.

When you had passed into the garden at the back, you would never have fancied you were in old France. Every tree and plant had been brought from foreign lands; he was such a tremendous fellow for collecting the curiosities of Nature, this wonderful Tartarin. His garden boasted, for instance, an example of the baobab-tree, the most gigantic of all trees in the world, but Tartarin's specimen was only big enough to occupy a mignonette pot. He was mightily proud of it, all the same.

The great sight of his place, however, was the hero's private den at the bottom of the garden. Picture to yourself a large hall gleaming from top to bottom with firearms and weapons of all sorts, gathered from every clime: carbines, rifles, blunderbusses, bowie-knives, revolvers, daggers, flint-arrows—in a word, examples of the deadly weapons of all races used by man in all parts of the world. Everything was wonderfully and neatly arranged, and labeled as if it were in a public museum. "Poisoned Arrows. Please do not touch!" was the warning on one of the cards. "Weapons loaded. Have a care!" greeted you from another. My word, it required some pluck to move about in the den of the great Tartarin.

There were books of travel and adventure, books about mighty hunting, on the table in the center of the room, and seated at the table was a short and rather fat, red-haired fellow of about forty-five years, with a closely-trimmed beard and a pair of bright eyes. He was in his shirt-sleeves. He was reading a book held in one hand while he gesticulated wildly with a large pipe held in the other. He was evidently imagining himself the daring hero of the story. This jolly-looking fellow was the great Tartarin of Tarascon, the intrepid, the incomparable Tartarin!

Now, at the time of which I speak, Tartarin had not risen to the great fame of his later years. He was certainly a man of note in Tarascon, but he had still to become the most famous man in all the south of

France. The people of Tarascon were tremendously fond of hunting, and Tartarin was the chief of the hunters. You may think this funny when you know there was not a living thing to shoot at within miles of Tarascon; scarcely a sparrow to attract local sportsmen. Ah, but you don't know how ingenious they are down there.

A DAY WITH THE GALLANT "CAP-HUNTERS" OF TARASCON

Every Sunday morning off the huntsmen sallied with their guns and ammunition, the hounds yelping at their heels. In the evening they came back well satisfied with their day's sport. And this is how they made up for the lack of game. Each man as he left in the morning took with him a brand new cap, and when they got well into the country and were ready for sport, they took their caps off, threw them high in the air, and shot at them as they fell. In the evening you would see them returning with their riddled caps stuck on the points of their guns, and of all these brave men Tartarin was the most admired, as he always swung into town with the most hopeless rag of a cap at the end of a day's sport.

There was nothing about wild beasts and hunting that Tartarin had not read, and there was absolutely nothing about them that he knew from actual experience. But it was enough for his friends of Tarascon that he was king of the cap-shooters, and you could see him any night sitting in the shop of Costecalde, the gunsmith, giving forth his opinions on the chase to an admiring audience of fellow-townsmen.

TARTARIN AS A MUSICIAN, AND THE FUNNY DUET

The people of Tarascon, in addition to this strange craze for the chase, are great lovers of sentimental songs, as we might expect from descendants of the old troubadours. Every family has its own favorite song. Bezuquet, the chemist, for instance, pins his faith to that beginning: "Oh, thou fair star, whom I adore!" Tartarin also fancied he could sing, but his vigorous bellowing was enough to make the old troubadours turn in their graves. Madame Bezuquet would induce him to take part in a duet in which all he had to do was to sing "No, no, no!" every few lines, and this he did with such superfluous energy that he had to wipe the perspiration from his face at the end of it. Feeling quite happy, however, he would drop into his club later on and say in an offhand way:

"I have just come from the Bezuquets', where they would have me sing in the duet from 'Robert le Diable.'" But the funniest part of it was he really believed he had been singing in a duet.

You can readily see how such a good-natured fellow was popular with everybody. All the soldiers quartered in Tarascon were for Tartarin to a man. The legal authorities and the common people equally admired his noble swagger. Surely there never was such a tremendous fellow, and yet withal he was not happy. He felt that he was capable of greater achievements than he had scope for in Tarascon.

His imagination had been so fired by reading the stories of brigands and pirates and Red Indians, to say nothing of big-game hunting, that he had come to be continually on the look-out for adventure, even when he walked about his own little town.

HOW THE GREAT MAN THIRSTED FOR SOME EXCITING ADVENTURE

Before leaving his villa to proceed to his club, he used regularly to practise with swords and pistols, so that he might be prepared if "they"—which stands for pirates, brigands, or anything of that sort—should attack him. He even chose the longest and darkest road to his club to prove how fearless he was, how little he cared for danger. But every night it was the same; after looking all the way and lingering outside the door in the hope of some adventure, he would at last go into his club murmuring: "Nothing! Nothing! always nothing!" and spend the evening playing cards.

Despite all his thirst for travel and adventure, Tartarin had never been farther than Beaucaire. Beaucaire is not very far from Tarascon. It is a town on the other side of the River Rhône, and it is connected with Tarascon by means of a bridge. But the bridge had often been swept away by storms, and in Tartarin's time it was so long and so rickety that —zounds! well, you understand. . . . Tartarin preferred to have a grip of the ground. You see, for all his adventurous spirit, he had a certain amount of caution. There were really two men in Tartarin. The one Tartarin said to him: "Cover yourself with glory." The other Tar-

tarin said to him: "Cover yourself with flannel." The one Tartarin, imagining himself fighting Indians, would call for "An axe! An axe! Somebody give me an axe!" The other Tartarin, knowing that he was cosy by his fireside, would ring the bell and say: "Jane, my coffee." Tartarin was really Don Quixote and Sancho Panza rolled into one. And that is why he had not yet ventured away from Tarascon.

TARTARIN'S IMAGINARY VOYAGE TO THE FAR EAST

Once, however, he just missed going on a great voyage to Shanghai. In fact, he nearly went, and people talked so much about his intention to go that after a time it seemed as if he had gone, and he himself began to believe he had actually been at Shanghai. People in fun would ask him what life was like out there, and he would tell them quite frankly, describing the raids of the Tartars.

"Then I put my men under arms," Tartarin would explain for the hundredth time, "ran up the consular flag, and—slap! bang! from the windows on the Tartars."

Really, you may think that Tartarin told lies, but it was not so. The fact is, the sun is so strong in the south of France, and particularly at Tarascon, that it seems to magnify everything, and raises in the minds of the imaginative people visions of things they would like to do, and have never done, but in time begin to believe they have done.

THE COMING OF THE LION TO TARASCON AND WHAT IT LED TO

But a time was to come at last when Tartarin was to find adventure. One evening at the gunsmith's, when the hero was explaining some mechanism of the rifle, the door was opened and an excited voice announced: "A lion! A lion!" The news seemed incredible, but you can imagine the terror that seized the little group in the gunsmith's, as they asked for more news. It appeared that the lion was to be seen in a traveling menagerie that had arrived from Beaucaire. Never had such a thing been known in Tarascon, and Tartarin's fellow cap-hunters began to think they had here an opportunity. The great man himself was lost in thought. A lion at last, and here in Tarascon! Suddenly, when the full truth had dawned upon him, he shouldered his gun, and, turning to Major Bravida, "Let us go to see him!" he thundered. Following him went the cap-hunters. Arrived at the menagerie, where many Tarasconians were already wandering from cage to cage, Tartarin entered with his rifle over his shoulder to make inquiries about the king of beasts. His entrance was rather a wet blanket to the spirits of the other visitors, who, seeing their hero thus armed, thought there might be danger, and were about to flee. But the proud bearing of the great man reassured them, and Tartarin continued his round of the booth until he faced the lion from the Atlas Mountains.

Here he stood carefully studying the creature, who sniffed and growled in surly temper, and then, rising, shook his mane and gave vent to a terrible roar, directed full at Tartarin. At this, most of the visitors made a rush for the door, women screaming, children tumbling over each other. Even the brave Bravida made a move away.

TARTARIN FACES THE KING OF BEASTS AND MAKES A MEMORABLE REMARK

Tartarin alone stood his ground, stern and immovable, in front of the cage, and the valiant cap-hunters, somewhat reassured by the bravery of their leader, again drew near and heard him murmur as he gazed on the lion: "Ah, yes, there's a hunt for you!"

Not another word did Tartarin utter that day. Yet next day nothing was spoken about in the town but his intention to be off to Algeria to hunt the lions of the Atlas Mountains. When asked if this were true, his pride did not let him deny it, and he pretended that it might be true. So the notion grew, until that night at his club Tartarin announced, amid tremendous cheering, that he was sick of cap-hunting, and meant very soon to set forth in pursuit of the lions of the Atlas.

Now began a great struggle between the two Tartarins already described. While the one was strongly in favor of the adventure, the other was strongly opposed to leaving his snug little house and the safety of Tarascon. But he had let himself in for this, and felt he would have to do it. So he began reading up books of African travel, and found from these how some of the explorers had trained themselves for the work by enduring hunger, thirst, and other

privations before they set out. Tartarin began cutting down his food, taking very watery soup. Early in the morning, too, he walked round the town seven or eight times, and at night he would stay in the garden from ten till eleven o'clock, alone with his gun, to inure himself to night chills; while so long as the menagerie remained in Tarascon a strange figure might have been seen in the dark prowling around the tent, listening to the growling of the lion. This was Tartarin, accustoming himself to be calm when the king of beasts was raging.

There had never been such a time in Tarascon as the period of preparation for Tartarin's great journey. It was the sole subject of conversation; everybody talked about the hero, and what he might do, and whether he would really go, or if it were only to be another visit to Shanghai!

THE HERO GROWS FAINT-HEARTED, BUT IS URGED TO HIS GREAT TASK

The feeling began to grow that the Tartarin who believed in covering himself with flannel was going to get the upper hand of the Tartarin who wanted to cover himself with glory. The hero was clearly shirking. He showed no haste to be off. The soldiers were the only people in the town who still believed in him, and one night Major Bravida went to Baobab Villa and said very solemnly: "Tartarin, you must go!"

It was a terrible moment for Tartarin, but he realized the solemnity of the words, and, looking around his cosy little den with a moist eye, he replied at length in a choking voice: "Bravida, I shall go!" Having made this final decision, he pushed ahead his final preparations with some show of haste. From Bompard's he had two large trunks, one inscribed with "Tartarin of Tarascon. Case of Arms." From Bezuquet he bought a portable medicine-chest, and he sent to Marseilles for all sorts of provisions of travel, including a patent camptent of the latest style.

Then the great day of his departure arrived. All the town was agog. The neighborhood of Baobab House was crammed with spectators. About ten o'clock the bold hero issued forth.

"He's a Turk! He's wearing spectacles!" This was the astonished cry of the beholders, and it was true, for Tartarin had thought it his duty to don Algerian costume because he was going to Algeria. He also carried two heavy rifles, one on each shoulder, a huge hunting-knife at his waist, and a revolver in a leather case. In addition to all this a pair of large blue spectacles were worn by him, for the sun in Algeria is terribly strong.

THE DEPARTURE FOR THE GREAT LION-HUNTING EXPEDITION

Making his way through the crowd, accompanied by some of his most valiant friends, he reached the railway station and ascended the many steps which lead up to the platform from the road below. The doors of the waiting-room had to be closed to keep the crowd out while the great man took leave of his friends, making promises to each, and jotting down notes on his tablets of the various people to whom he would send lion-skins. Then the train came in, and had almost left again before the strangely-dressed hero had time to jump into a carriage full of Parisian ladies, whom he nearly frightened to death with his rifles and other deadly weapons.

The wonderful town of Marseilles was less surprised at the grotesque figure of Tartarin with his guns over his shoulders, than he was with the town. The mistral, the great wind that blows along the Mediterranean, was in full vigor when he embarked for the land of the lions, and he thought it a happy augury, as though the spirits of the air were trumpeting a triumphant farewell to the hero of France.

HOW TARTARIN BEHAVED ON HIS VOYAGE ACROSS THE MEDITERRANEAN

Oh that I had the brush of an artist, that I might paint you some pictures of Tartarin of Tarascon during his three days aboard the "Zouave" on the voyage to Algeria! But I have no facility with the brush, and mere words cannot convey how Tartarin passed from the proudly heroic to the hopelessly miserable in the course of the journey. Worst of all, when lying in his bunk, robbed of all his glory by sea-sickness, he had to listen to Tartarin of the flannel saying to Tartarin of the glory:

"This serves you right, you silly old chap! Didn't I tell you what it would be? But you would go to Africa! Oh, yes, you would insist on going to hunt lions! Now here you are, and how are you enjoying yourself?"

Still worse was it for him to know, while he was groaning in his stuffy bunk, that a very merry party of passengers were enjoying themselves in the saloon. He was still in his berth when the ship came to her moorings at Algiers, and he got up with a sudden jerk, under the impression that the "Zouave" was sinking. Seizing his many weapons, he rushed on deck, to find it was not foundering, but only arriving.

THE LION HUNTER'S LITTLE MISTAKE ABOUT THE ALGERIAN PIRATES

Under the bluest of blue skies lay Algiers the Fair, formerly the haunt of pirates, and still infested with the most desperate sea-rovers, to the heated imagination of Tartarin, who shouted: "To arms!" when the villainous-looking porters boarded the vessel, as he thought they were the pirates. Soon after Tartarin had set foot on shore, following a great negro porter, he was almost stupefied by the babel of tongues; but, fortunately, a policeman took him in hand and had him directed, together with his enormous collection of baggage, to the European Hotel. What surprised him most about the town, which he expected would be a real Arabian Nights city, was to find it just like Tarascon, with its cafés and its restaurants and French names everywhere.

On his arrival at the hotel, he was so very fatigued that his marvelous collection of weapons had to be taken from him, and he had to be carried to bed, where he snored very soundly until it was striking three o'clock next day. He had slept all the evening, through the night and morning, and well into the next afternoon!

TARTARIN IN LION-LAND AT LAST, AND HIS FIRST EXPLOIT

He awakened refreshed, and the first thought in his mind was: "I'm in Lion-land at last!" But he thought of this with a cold shiver, and dived under the bedclothes. A moment later he determined to be up. Exclaiming: "Now for the lions!" he jumped on the floor and began his preparations.

His plan was to go out at once into the country, take ambush for the night, shoot the first lion that came along, and then back to the hotel for breakfast. So he went off, carrying not only his usual arsenal, but the marvelous patent tent strapped to his back. He attracted no little attention as he trudged along, and when he caught sight of a very fine camel, his heart beat fast, for he thought that the lions could not be very distant now.

It was quite dark by the time he had got only a little way beyond the outskirts of the town, scrambling over ditches and bramble-hedges. After much hard work of this kind, the mighty hunter suddenly stopped, whispering to himself: "I seem to smell a lion hereabouts." He sniffed keenly in all directions. To his excited imagination, it seemed a likely place for a lion; so, dropping on one knee, and laying one of his guns in front of him he waited.

He waited very patiently. One hour, two hours; but nothing stirred. Then he suddenly remembered that great lion-hunters take a little young goat with them to attract the lion by its bleating. Having forgotten to supply himself with one, Tartarin conceived the happy idea of bleating like a goat. He started softly calling: "Meh, meh!" He was really afraid that a lion might hear him, but as no lion seemed to be paying attention he became bolder in his "mehs," until the noise he made was like the bellowing of a bull.

THE GREAT ADVENTURE IN A SUBURBAN KITCHEN GARDEN

But hush! What was that? A huge black object had for the moment loomed up against the dark blue sky. It stopped, sniffing the ground; then seemed to move away again, only to return suddenly. It must be the lion at last; so, taking a steady aim, bang went the gun of Tartarin, and a terrible howling came in response. Clearly his shot had told; the wounded lion had made off. He would now wait for the female to appear, as his books had taught him.

But two or more hours passed, and she did not come; and the ground was damp, and the night air cold, so the hunter thought he would camp for the night. After much struggling, he could not get his patent tent to open. Finally, he threw it on the ground in a rage and lay on the top of it. Thus he slept until the bugles in the barracks near by wakened him in the morning. For, behold, instead of finding himself out on the Sahara, he was in the kitchen garden of a suburban Algerian!

"These people are mad," he growled

to himself, "to plant their artichokes where lions are roaming about. Surely I have not been dreaming. Lions do come here; there's proof positive."

Following from artichoke to artichoke, from field to field, he followed the thin trail of blood, and came at length to a poor little donkey he had wounded!

Tartarin's first feeling was one of vexation. There is such a difference between a lion and an ass, and the poor little creature looked so innocent. The great hunter knelt down and tried to staunch the donkey's wounds, and it seemed grateful to him, for it feebly flapped its long ears two or three times before it lay still for ever.

Suddenly a voice was heard calling: "Noiraud! Noiraud!" It was "the female." She came in the form of an old French woman with a large red umbrella, and it would have been better for Tartarin to have faced a female lion than this very angry old lady.

TARTARIN "GOES SOUTH" AFTER MISTAKING A DONKEY FOR A LION

When the unhappy man tried to explain how he had mistaken her little donkey for a lion, she thought he was making fun of her, and belabored him with her umbrella. When her husband came on the scene, the matter was soon adjusted by Tartarin agreeing to pay 200 francs for the damage he had done, the price of the donkey being really something like ten or twelve francs. The donkey-owner was the innkeeper, and the sight of Tartarin's money made him quite friendly, so that he invited the lion-hunter to have some food at the inn with him before he left. And as they walked thither Tartarin was amazed to be told by the innkeeper that he had not seen a lion there in twenty years!

Clearly, the lions were to be looked for farther south. "I'll make tracks for the south, too," said Tartarin to himself. But he first of all returned to his hotel in an omnibus. Think of it! This distinguished hunter, dressed like a Turk, with his guns, revolvers, and knives, to say nothing of his tent, going back to town on the top of an omnibus! But before he went south on the high adventure, he loafed about the city of Algiers for some time, going to the theatres and other places of amusement, where he met a man who called himself Prince Gregory of Montenegro, with whom he made friends. The fact was, poor old Tartarin had been stricken with love for one of the veiled Moorish women of Algiers, whom he had first seen on the omnibus, and he was hanging about the town in the hope of meeting her again. The prince kindly undertook to find her for him, and set about it at once.

IN LOVE WITH A MOORISH LADY AND FRIENDS WITH A PRINCE

Very soon he pretended he had found her, and all would be well if Tartarin would write a letter to her, which the prince would deliver. Meanwhile, he had to buy an enormous number of pipes to send her, as he was told she was a great smoker, like all Moorish ladies.

At last a meeting was arranged, and the prince accompanied Tartarin to the house of the lady, who received him sitting on her divan in true oriental fashion, smoking her hookah. Tartarin was greatly delighted to meet the lady. She entertained him by dancing and playing on the guitar. Still, he doubted whether she really was the unknown fair one of the omnibus. He was so delighted to visit her that he might never have gone southward after the lions had not the captain of the "Zouave" come across him in Algiers one day, and hinted that the prince and the lady were making a fool of him. In addition, Tartarin happened to read a note from Tarascon in a newspaper which the captain had with him, and there it spoke of the uncertainty that prevailed as to the fate of the great hunter, winding up with this paragraph:

"Some negro traders state, however, that they met in the open desert a European whose description answers to that of Tartarin and who was making tracks for Timbuctoo. May Heaven guard for us our hero!"

THE FIRST LION THAT TARTARIN MET IN ALGERIA

Tartarin went red and white by turns as he read this, and realized that he was in for it. He very much wished to return to his beloved Tarascon, but to go there without having shot some lions —one at least—was impossible, and so it was Southward ho!

He was keenly disappointed, after a very long journey in the stage-coach, to be told that there was not a lion left in all Algeria, though a few panthers might

still be found worth shooting. He got out at the town of Milianah, and let the coach go on, as he thought he might as well take things easily if, after all, there were no lions to be shot. But, to his amazement, he came across a real live lion at the door of a café.

"What made them say there were no more lions?" he cried, astounded at the sight. The lion lifted in its huge mouth a wooden bowl from the pavement, and a passing Arab threw a copper in the bowl, at which the lion wagged its tail. Suddenly the truth occurred to Tartarin. Here was a poor, blind, tame lion, which a couple of negroes were taking through the streets, just like a performing dog. His blood was up at the very idea. Shouting: "You scoundrels, to humiliate these noble beasts so!" he rushed and took the degrading bowl from the royal jaws of the lion. This led to a quarrel with the negroes, at the height of which Prince Gregory of Montenegro came upon the scene.

TARTARIN AS A CAMEL-RIDER IS NOT A SUCCESS

The prince told him a most untrue story about a convent in the north of Africa where lions were kept, to be sent out with priests to beg for money. He also assured him that there were lots of lions in Algeria, and that he would join him in his hunt.

Thus it was in the company of the so-called Prince Gregory, and with a following of half a dozen negro porters, that Tartarin set off early next morning for the Shereef Plain; but they very soon had trouble, both with the porters and with the provisions Tartarin had brought for his great journey. The prince suggested dismissing the negroes and buying a couple of donkeys, but Tartarin could not bear the thought of donkeys, for a reason with which we are acquainted. He readily agreed, however, to the purchase of a camel, and when he was safely helped up on its hump, he sorely wished the people of Tarascon could see him. But his pride speedily had a fall, for he found the movement of the camel worse than that of the boat in crossing the Mediterranean. For the remainder of their expedition, which lasted nearly a month, Tartarin preferred to walk on foot and lead the camel.

From village to village they went, the prince always telling Tartarin wonderful stories of the lions that might be met, but never a sign of a lion was seen. One night, in the desert, however, Tartarin was sure he heard sounds just like those he had studied at the back of the traveling menagerie at Tarascon. He was positive they were in the neighborhood of a lion at last. He prepared to go forward to stalk the beast. The prince offered to accompany him, but Tartarin resolutely refused. He would meet the king of beasts alone!

THE HERO GOES FORTH ALONE TO SLAY THE ROARING LION

He entrusted his pocket-book, full of precious documents and banknotes, to his pretended friend, in case he might lose it in a tussle with the lion, and so moved forward. His teeth were chattering in his head, and his rifle was rattling on the hilt of his hunting-knife when he lay down, trembling, to await the lion.

It must have been nearly two hours before he was sure that the beast was moving quite near him in the dry bed of a river. Firing two shots into the darkness in the direction whence the sound came, he got up and bolted back to where he had left the camel and the prince—but there was only the camel there now! The dishonest impostor had waited a whole month for this chance to make off with Tartarin's money.

In the morning the truth dawned slowly upon him that he had been robbed by a thief who pretended to be a prince. And here he was in the heart of savage Africa with a little pocket-money only, much useless luggage, a camel, and not a single lion-skin to show for all his trouble.

Sitting on one of the desert-tombs erected over pious Mohammedans, the great man began to weep bitterly. But even as he wept the bushes were pushed aside a little in front of him, and a huge lion presented itself.

A LION AT LAST, AND HOW TARTARIN NEARLY BLEW IT TO PIECES

It advanced towards him, howling terribly. To his honor, be it said, Tartarin never moved a muscle, but, breathing a fervent "At last!" he leaped to his feet, and leveling his rifle, planted two explosive bullets in the lion's head. All was over in a moment, for he had nearly blown the king of beasts to pieces! But in another moment he saw two tall, enraged negroes bearing down upon him with their cudgels. He had seen them

before at Milianah, and this was their poor, blind lion! Fortunately for Tartarin, he was not so deeply in the desert as he had thought, but was merely outside the town of Orleansville, and a policeman from that place now came up, attracted by the firing, and took full particulars.

The upshot of it was that he had to suffer much delay in Orleansville, and was eventually fined the sum of 2,500 francs. How to pay this was a problem which he was only able to solve by selling his weapons and all his extensive outfit, bit by bit, to different buyers. When his debts were paid, he had nothing but the lion's skin and the camel. The former he despatched to Major Bravida at Tarascon, and the camel he intended to try to sell in order to pay his coach fare back to Algiers. But nobody would buy the poor creature, and its master had to face all the journey in short stages on foot.

THE AFFECTIONATE CAMEL THAT STOOD BY ITS MASTER

The camel showed a curious affection for him, and followed him as faithfully as a dog. When, at the end of eight days' weary tramping, he came at last to Algiers, he did all he could to lose the animal, and hoped he had succeeded. He met the captain of the "Zouave," who told him that all Algiers had been laughing at the story of how he had killed the blind lion, and he offered Tartarin a free passage home.

The "Zouave" was getting up steam next day, as the dejected Tartarin, no longer the owner of splendid weapons or needing portage for his luggage, but so destitute that his hands were all he had in his pockets, had just stepped into the captain's long-boat, when, lo! his faithful camel, which had been hunting for him for the last twenty-four hours, came tearing down to the quay and gazed affectionately at its friend. Tartarin pretended not to notice it; but the animal seemed to implore him with his eyes to be taken away. "You are the last Turk," it seemed to say, "I am the last camel. Let us never part again, O my Tartarin!"

But the lion-hunter pretended to know nothing of this ship of the desert.

As the boat pulled off to the "Zouave," the camel jumped into the water and swam after it, and was taken aboard. Tartarin spent the return voyage in his state-room, not because of the rough weather this time, but because he could not venture on deck without being worried by the camel. At last, however, our hero had the joy of hearing the "Zouave" cast anchor at Marseilles, and, having no luggage to trouble him, he rushed off the boat at once and hastened through the town to the railway station, hoping to get ahead of the camel.

HOW THE CAMEL HELD ITS OWN WITH THE TRAIN AND GOT TO TARASCON

He booked third class, and quickly hid himself in a carriage. Off went the train. All was well, he thought. But the train had not gone far when everybody was looking out of the windows and laughing. Behind the train ran the camel—he was holding his own, too!

What a humiliating home-coming! All his weapons of the chase left on Moorish soil, not a lion with him, nothing but a stupid camel!

"Tarascon! Tarascon!" shouted the porters as the train slowed up at the station, and our hero got out. He had hoped to slink home unobserved; but, to his amazement, he was received with shouts of "Long live Tartarin!" "Three cheers for the lion-slayer!" The people waved their caps in the air; it was no joke, they were serious. There was the brave Major Bravida, and there the more noteworthy cap-hunters, who clustered round their chief and carried him in triumph down the stairs.

THE HAPPY RESULT OF SENDING HOME A LION'S SKIN

Now, all this was the result of sending home the skin of the blind lion. Isn't it wonderful what a skin can do for one? But the climax was reached when, following the crowd down the stairs of the station, limping from his long run, came the camel. Even this Tartarin was happily able to turn to good account, He reassured his fellow-citizens, patting the camel's hump:

"This is my camel; a noble beast! It has seen me kill all my lions."

And so, linking his arm with the worthy major, he calmly wended his way to Baobab House, amid the ringing cheers of the populace. On the road he began a recital of his great hunts.

"Picture to yourself," he said, "a certain evening in the open Sahara——"

THE NEXT FAMOUS BOOKS ARE ON PAGE 4751.

A POEM OF PATRIOTISM

THIS strong poem by Charles Sangster 1822-93, a Canadian author and journalist of the last generation, strikes a high note of patriotism. Though Canada lacks the legends and tales of the old world, the vigorous young nation has the material for literature in its abounding national life. The eyes of Canadians are on the future rather than on the past, and to the work of building a great nation in a great land their chief energies are now directed. Appreciation of their own country, and the belief in its future distinguish much Canadian poetry of the present. Though the early days are remembered with tender sympathy, Canadians believe that the best is yet to be. The other poems by Canadian authors included in this section show a considerable range of thought and feeling.

OUR NORLAND

CONTINUED FROM 4522

WE have no Dryads in our woods,
No Fairies in the hills,
No Nereids in the crystal floods,
Nor Undines in the rills;
No jolly Satyrs such as he,
The gentle Spenser, found
In that rare Dream of Chivalry
With which his muse is crowned:

No sacred Fawns, no Druid oaks,
No Sylvan deities,
No Ouphs to hold along the brooks
Their midnight revelries;
No Ogres, guarding castle-keeps,
No Witches wild and lean,
No crafty Sirens from the deeps,
No Genii from the green:

No mellow-throated nightingales
Rousing the wilds with song,
While Echo waits through all the vales
The sweet notes to prolong;
No larks, at heaven's coral gate,
To celebrate the day
In fiery strains, and passionate
Outbursts of lyric lay.

But we have birds of plumage bright,
And warblers in our woods,
Whose hearts are well-springs of delight,
Whose haunts, the solitudes—
The dim, untrodden wilderness,
Where wildness reigns supreme—
God's solemn temple none the less
Than some romantic dream;

Vast ev'n beyond the thought of man,
Magnificently grand;
Coeval with the first great plan
From Nature's artist-hand:
Deep within deep, and wild on wild,
In savage roughness rolled,
Grandeur on grandeur heaped and piled
Through lusty days of old:

The stern-browed cape, the lofty peak
Round which the mists are curled,
Whence Fancy not in vain might seek
The circle of the world:
Broad inland seas and lovely lakes
Their tributes seaward pour
O'er cataracts, whose thunder shakes
The granite-belted shore:

The rugged oak, the regal pine,
Our woodland monarchs, these,
Whose strong arms nursed the circling vine
Through countless centuries:
Their reign was from the days of eld,
Their hosts were mighty peers,
Who fought and fell as time compelled
The battle of the years.

We have no feudal castles old,
Like eyries perched on high,
Whence issue knights or barons bold,
To ravage and destroy:
But we've the remnant of a race
As bold and brave as they,
Whether in battle or the chase—
The Red Man of to-day.

How brave—how great—in days of yore,
Their scanty legends tell;
The soul a-hungered craves for more,
But lo! beneath the swell
Of Time's resistless, onward roll,
The unwritten secrets lie,
No voice from out the distant goal,
No answer but a sigh.

For Time, like some old miser, keeps
The record of the Tribes,
And will not yield it from the deeps
For promises or bribes.
What mighty Chiefs! what Sachems gray!
What multitudes of Braves!
But what remains of those to-day?
A continent of graves!

And in their stead the Old World pours
Its streams of living men—
Its hearts of oak, along our shores
To people hill and glen;
To battle through a nation's youth
Until, by heaven's grace,
We rise, in freedom and in truth,
Another British race.

Stand up, then, in thy youthful pride,
O nation yet to be,
And wed this great land to its bride,
The broad Atlantic Sea;
Fling out Britannia's flag above
Our heaven-born endeavour,
Our chain of waves, one chain of love,
Uniting us for ever.

JACQUES CARTIER

The celebrated French navigator, Jacques Cartier, was the first European to explore the waters of Canada. He spent a winter there and gave Mount Royal and the Bay of St. Lawrence their names. Thomas D'Arcy McGee, an Irish-Canadian poet and politician, in this poem gives us the picture of Cartier's departure on his second voyage and of his safe return.

IN the seaport of St. Malo, 'twas a smiling morn in May,
When the Commodore Jacques Cartier to the westward sailed away;
In the crowded old Cathedral all the town were on their knees,
For the safe return of kinsmen from the undiscovered seas;
And every autumn blast that swept o'er pinnacle and pier,
Filled manly hearts with sorrow, and gentle hearts with fear.

A year passed o er St. Malo—again came round the day
When the Commodore Jacques Cartier to the westward sailed away;
But no tidings from the absent had come the way they went,
And tearful were the vigils that many a maiden spent;
And manly hearts were filled with gloom, and gentle hearts with fear,
When no tidings came from Cartier at the closing of the year.

But the earth is as the future, it hath its hidden side,
And the Captain of St. Malo was rejoicing in his pride;
In the forests of the North—while his townsmen mourned his loss—
He was rearing on Mount Royal the *fleur-de-lis* and cross;
And when two months were over, and added to the year,
St. Malo hailed him home again, cheer answering to cheer.

He told them of a region, hard, iron-bound, and cold,
Nor seas of pearl abounded,nor mines of shining gold;
Where the wind from Thulé freezes the word upon the lip,
And the ice in Spring comes sailing athwart the early ship;
He told them of the frozen scene, until they thrilled with fear,
And piled fresh fuel on the hearth to make them better cheer.

But when he chang'd the strain—he told how soon are cast,
In early Spring, the fetters that hold the waters fast;
How the wintry causeway, broken, is drifted out to sea,
And the rills and rivers sing with pride the anthem of the free;
How the magic wand of Summer clad the landscape to his eyes,
Like the dry bones of the just when they wake in Paradise.

He told them of the Algonquin braves—the hunters of the wild;
Of how the Indian mother in the forest rocks her child;
Of how, poor souls! they fancy in every living thing
A spirit good or evil, that claims their worshipping;
Of how they brought their sick and maim'd for him to breathe upon;
And of the wonders wrought for them, thro' the Gospel of St. John.

He told them of the river whose mighty current gave
Its freshness for a hundred leagues to Ocean's briny wave;
He told them of the glorious scene presented to his sight,
What time he reared the cross and crown on Hochelaga's height;
And of the fortress cliff that keeps of Canada the key;—
And they welcomed back Jacques Cartier from his perils o'er the sea.

WHEN SUMMER COMES*

This poem by a Canadian author, John E. Logan ("Barry Dane"), is not strong, but has a certain haunting sweetness and melody which is immediately felt, yet difficult to define.

WHEN summer comes,
Ah, so we longing sigh,
When winter winds are nigh
When summer comes;
Our pulses like the rill
That now lies cold and still
Beneath the snow,
Will joyous flow
When summer comes.

When summer comes,
A messenger will bring
New life to everything,
When summer comes;
And unto you and me
Now parted, there may be
A moment sweet,
What time we meet,
When summer comes.

When summer comes,
Ah, the sweet, longed-for day
May be, yet pass away,
When summer comes;
And our sad feet have missed
The long expected tryst—
What shall we know
Of joy or woe
When summer comes?

When summer comes,
Alas, our hearts may yearn
For winter to return,
When summer comes;
The future we forecast,
We dream its joys shall last,
To-day is fraught
With but one thought
When summer comes."

* By permission of the author.

THE UNNAMED LAKE *

Reverend Frederick George Scott, clergyman, author and poet, has produced in this simple, short poem a little masterpiece.

IT sleeps among the thousand hills
  Where no man ever trod,
And only nature's music fills
  The silences of God.

Great mountains tower above its shore,
  Green rushes fringe its brim,
And o'er its breast for evermore
  The wanton breezes skim.

Dark clouds that intercept the sun
  Go there in Spring to weep,
And there, when Autumn days are done,
  White mists lie down to sleep.

Sunrise and sunset crown with gold
  The peaks of ageless stone,
Where winds have thundered from of old
  And storms have set their throne.

No echoes of the world afar
  Disturb it night or day,
But sun and shadow, moon and star,
  Pass and repass for aye.

'Twas in the grey of early dawn
  When first the lake we spied,
And fragments of a cloud were drawn
  Half down the mountain side.

Along the shore a heron flew,
  And from a speck on high,
That hovered in the deepening blue,
  We heard the fish-hawk's cry.

Among the cloud-capt solitudes,
  No sound the silence broke,
Save when, in whispers down the woods,
  The guardian mountains spoke.

Through tangled brush and dewy brake,
  Returning whence we came,
We passed in silence, and the lake
  We left without a name.

A CANADIAN BOAT-SONG

Thomas Moore, the celebrated writer of Irish melodies, has written this charming Canadian boat-song. Listen to the distant song of the rapids, and note the sense of danger which is suggested by the changing metre of the refrain.

FAINTLY as tolls the evening chime
  Our voices keep tune and our oars keep time;
Soon as the woods on shore look dim,
We'll sing at St. Anne's our parting hymn.
  Row, brothers, row, the stream runs fast,
  The rapids are near, and the daylight's past.

Why should we yet our sail unfurl?
There is not a breath the blue wave to curl;
But when the wind blows off the shore
O sweetly we'll rest our weary oar.
  Blow, breezes, blow, the stream runs fast,
  The rapids are near, and the daylight's past.

Utaw'a's tide! this trembling moon
Shall see us float over thy surges soon.
Saint of this green isle! hear our prayers;
O grant us cool heavens and favouring airs.
  Blow, breezes, blow, the stream runs fast,
  The rapids are near, and the daylight's past.

* By permission of the author.

THE SONG MY PADDLE SINGS *

E. Pauline Johnson, daughter of Chief Johnson of the Mohawk Indians of Canada, was the author of this beautiful poem, set to the rhythm of the paddle of a canoe.

WEST wind, blow from your prairie nest,
  Blow from the mountains, blow from the west.
The sail is idle, the sailor too;
Oh! wind of the west, we wait for you.
Blow, blow!
I have wooed you so,
But never a favour you bestow;
You rock your cradle the hills between,
But scorn to notice my white lateen.

I stow the sail and unship the mast:
I wooed you long, but my wooing's past;
My paddle will lull you into rest:
O drowsy wind of the drowsy west,
Sleep, sleep!
By your mountains steep,
Or down where the prairie grasses sweep,
Now fold in slumber your laggard wings,
For soft is the song my paddle sings.

August is laughing across the sky,
Laughing while paddle, canoe, and I
Drift, drift,
Where the hills uplift
On either side of the current swift.
The river rolls in its rocky bed,
My paddle is plying its way ahead,
Dip, dip,
When the waters flip
In foam as over their breast we slip.

And oh, the river runs swifter now;
The eddies circle about my bow:
Swirl, swirl!
How the ripples curl
In many a dangerous pool awhirl!
And forward far the rapids roar,
Fretting their margin for evermore
Dash, dash;
With a mighty crash,
They seethe and boil, and bound and splash.

Be strong, O paddle! be brave, canoe!
The reckless waves you must plunge into.
Reel, reel,
On your trembling keel,
But never a fear my craft will feel.
We've raced the rapids; we're far ahead;
The river slips through its silent bed.
Sway, sway,
As the bubbles spray
And fall in tinkling tunes away.

And up on the hills against the sky,
A fir-tree rocking its lullaby
Swings, swings,
Its emerald wings,
Swelling the song that my paddle sings.

* By permission of L. A. Makovski, Executor.

THE WALKER OF THE SNOW

Charles Dawson Shanley gives great vividness and reality to an old legend of the haunted valley and the Shadow Hunter.

SPEED on, speed on, good Master!
The camp lies far away;
We must cross the haunted valley
Before the close of day.

How the snow-blight came upon me
I will tell you as I go,—
The blight of the Shadow Hunter,
Who walks the midnight snow.

To the cold December heaven
Came the pale moon and the stars,
As the yellow sun was sinking
Behind the purple bars.

The snow was deeply drifted
Upon the ridges drear,
That lay for miles around me
And the camp for which we steer.

'Twas silent on the hillside,
And by the solemn wood,
No sound of life or motion
To break the solitude,

Save the wailing of the moose-bird
With a plaintive note and low.
And the skating of the red leaf
Upon the frozen snow.

And said I, "Though dark is falling,
And far the camp must be,
Yet my heart it would be lightsome
If I had but company."

And then I sang and shouted,
Keeping measure, as I sped,
To the harp-twang of the snow-shoe
As it sprang beneath my tread.

Not far into the valley
Had I dipped upon my way,
When a dusky figure joined me,
In a capuchon of gray,

Bending upon the snow-shoes,
With a long and limber stride;
And I hailed the dusky stranger
As we travelled side by side.

But no token of communion
Gave he by word or look,
And the fear-chill fell upon me
At the crossing of the brook.

For I saw by the sickly moonlight
As I followed, bending low,
That the walking of the stranger
Left no footmarks on the snow.

Then the fear-chill gathered o'er me,
Like a shroud around me cast,
As I sank upon the snow-drift
Where the Shadow Hunter passed.

And the other trappers found me,
Before the break of day,
With my dark hair blanched and whitened
As the snow in which I lay.

But they spoke not as they raised me;
For they knew that in the night
I had seen the Shadow Hunter,
And had withered in his blight.

Sancta Maria speed us!
The sun is falling low,—
Before us lies the valley
Of the Walker of the Snow!

THE RED RIVER VOYAGEUR*

Pioneer days in Canada were full of dangers and difficulties. The American poet, John Greenleaf Whittier, pictures the boatman on the Red River listening to the far-away sound of the Mission bells that speak to him of peace and protection.

OUT and in the river is winding
The links of its long, red chain,
Through belts of dusky pine land
And gusty leagues of plain.

Only, at times, a smoke-wreath
With the drifting cloud-rack joins—
The smoke of the hunting-lodges
Of the wild Assiniboins!

Drearily blows the north wind
From the land of ice and snow;
The eyes that look are weary,
And heavy the hands that row.

And with one foot on the water,
And one upon the shore,
The Angel of Shadow gives warning
That day shall be no more.

Is it the clang of wild geese?
Is it the Indian's yell,
That lends to the voice of the north wind
The tones of a far-off bell?

The voyageur smiles as he listens
To the sound that grows apace;
Well he knows the vesper ringing
Of the bells of St. Boniface.

The bells of the Roman Mission,
That call from their turrets twain,
To the boatman on the river,
To the hunter on the plain!

Even so in our mortal journey
The bitter north winds blow,
And thus upon life's Red River
Our hearts, as oarsmen, row.

And when the Angel of Shadow
Rests his feet on wave and shore,
And our eyes grow dim with watching,
And our hearts faint at the oar,

Happy is he who heareth
The signal of his release
In the bells of the Holy City,
The chimes of eternal peace!

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THE MOUNTED POLICE*

Robert W. Service celebrates in this poem the bravest body of men on the continent. Dauntless and daring, the Northwest Mounted Police are the right arm of the law, and the terror of the evil-doer throughout all that vast territory.

IN the little Crimson Manual it's written plain and clear,
That who would wear the scarlet coat shall say good-bye to fear;
Shall be a guardian of the right, a sleuth-hound of the trail—
In the little Crimson Manual there's no such word as "fail."
It's duty, duty, first and last, the Crimson Manual saith;
The Scarlet Rider makes reply: "It's duty—to the death."
And so they sweep the solitudes, free men of all the earth;
And so they sentinel the woods, the wilds that know their worth;
And so they scour the startled plains, and mock at hurt and pain,
And read their Crimson Manual, and find their duty plain.
Knights of the lists of unrenown, born of the frontier's need,
Disdainful of the spoken word, exultant in the deed;
Unconscious heroes of the waste, proud players of the game;
Props of the power behind the throne, upholders of the name;
For thus the Great White Chief hath said, "In all my lands be peace,"
And to maintain his word he gave his West the Scarlet Police.

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HARVEST TIME*

That wonderful hush of fruition which comes to the fields which are fully ripe, and before the bustle and activity of gathering the harvest, is well described in this poem by E. Pauline Johnson, who was born in 1862 and died in 1913.

PILLOWED and hushed on the silent plain,
Wrapped in her mantle of golden grain,

Wearied of pleasuring weeks away,
Summer is lying asleep to-day,—

Where winds come sweet from the wild-rose briers
And the smoke of the far-off prairie fires.

Purple her eyes as the mists that dream
At the edge of some laggard sun-drowned stream,

But over their depths the lashes sweep,
For Summer is lying to-day asleep.

The north wind kisses her rosy mouth
His rival frowns in the far-off south,

And comes caressing her sunburnt cheek,
And Summer awakes for one short week;

Awakes and gathers her wealth of grain,
Then sleeps and dreams for a year again.

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THE RAPID

This poem by Charles Sangster, Canadian journalist and poet, is full of the dash and danger of the rushing rapid.

ALL peacefully gliding,
The waters dividing,
The indolent batteau moved slowly along;
The rowers light-hearted,
From sorrow long parted,
Beguiled the dull moments with laughter and song:
"Hurrah for the Rapid! that merrily, merrily
Gambols and leaps on its tortuous way;
Soon we will enter it, cheerily, cheerily,
Pleased with its freshness, and wet with its spray."

More swiftly careering,
The wild Rapid nearing,
They dash down the stream like a terrified steed;
The surges delight them,
No terrors affright them,
Their voices keep pace with their quickening speed:
"Hurrah for the Rapid! that merrily, merrily
Shivers its arrows against us in play;
Now we have entered it, cheerily, cheerily,
Our spirits as light as its feathery spray."

Fast downwards they're dashing,
Each fearless eye flashing,
Though danger awaits them on every side;
Yon rock—see it frowning!
They strike—they are drowning!
But downward they speed with the merciless tide:
No voice cheers the Rapid, that angrily, angrily
Shivers their bark in its maddening play;
Gaily they entered it—heedlessly, recklessly
Mingling their lives with its treacherous spray!

SONG OF THE GOLDEN SEA*

This "Song," by Jean Blewett, the author of "The Cornflower and Other Poems," brings a beautiful picture before the eye.

SING, ye ripening fields of wheat,
Sing to the breezes passing by,
Sing your jubilant song and sweet,
Sing to the earth, the air, the sky!

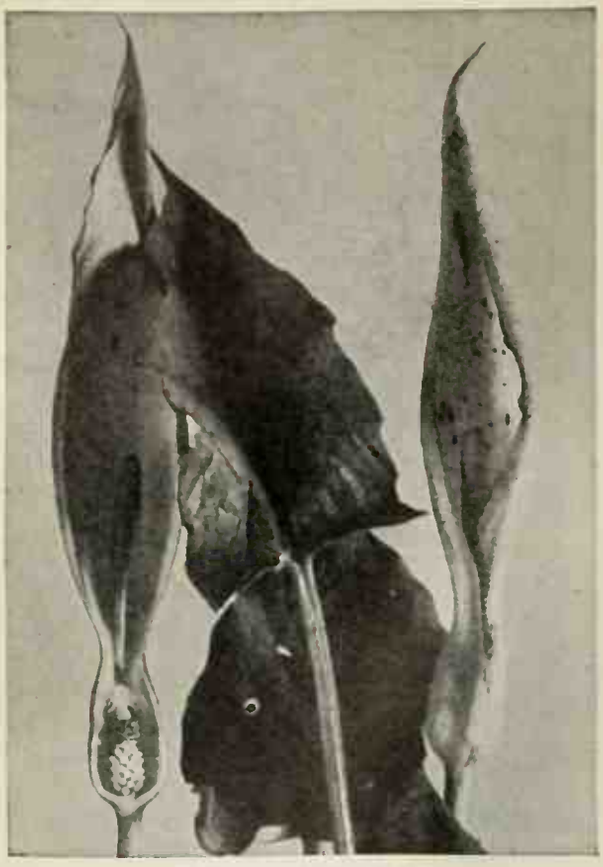
Earth that held thee and skies that kissed
Morning and noon and night for long,
Sun and rain and dew and mist,
All that has made you glad and strong!

The harvest fields of the far, far west
Stretch out a shimmering sea of gold!
Every ripple upon its breast
Sings peace, and plenty and wealth untold!

Far as the eye can reach it goes,
Farther yet, 'til there seems no end,
Under a sky where blue and rose
With the gold and turquoise softly blend.

Here, where sweep the prairies lone,
Broad and beautiful in God's eyes,
Here in this young land, all our own,
The garner-house of the old world lies.

* By permission of the author.



THE CUCKOO-PINT

The cuckoo-pint, or wake-robin, has a great rolled-up leaf, like a monk's hood, inside which form the bright red berries that are called lords-and-ladies.

THE COWSLIP

We all know the yellow funnel-shaped flowers of the cowslip, with their fragrance and store of honey. In this country the cowslip is a garden flower.

THE COLT'S-FOOT

The colt's-foot gets its name from its leaf, which is shaped like the hoof of a colt. The flowers, like bright golden stars, are among the first that appear in spring. The leaves are used as a remedy for coughs.

THE LADY'S SMOCK

The lady's smock, or cuckoo flower, is common in American marshes in spring. The blossoms, ranging from pale purple to white, have a dainty appearance. Country people eat the leaves as salad.

FLOWERS OF BRITISH AUTHORS

CONTINUED FROM 4565

WHEN we are reading either prose or poetry of English authors, from the earliest times to Shakespeare, and until now, we constantly find references to certain flowers. These are very familiar to the English people, but for Americans, the quaint old names rarely call forth any mental picture of the plants, except, perhaps, of a few that are grown in our gardens, such as the daisy and the daffodil.

Yet around some of them a wealth of legend and folklore has arisen, and their very names, various as they may be, reveal glimpses of history and custom, or of the keen observation of nature that has contributed towards their naming. Many plants received their titles when fairies were abroad in the land, and needed thimbles and stools and rings to dance in. Others won their names by their colors, or their uses, real or imagined, and by their fancied resemblance to something else.

THE CUCKOO-PINT

As our shadbush blooms when the shad are running, so the cuckoo-pint of Great Britain enters into its prime when the cuckoos begin to cluck furtively in the budding trees. It is an arum not unlike our jack-in-the-pulpit, or skunk-cabbage, and strange as it may seem, is a distant relation of the exquisite white calla. It has a great many common names, as lords and ladies, or wake-robin, and the fruit is called snake's meat, poison berries, and various other scornful names. Towards the end of January or early in February the great, glossy green, arrow-shaped leaves of the cuckoo-pint break through the earth, at first rolled up, but soon expanding, and then many of them show purplish-black blotches.

But it is not until late in March or early in April that the pale yellow green hoods come up and open their fronds, revealing the purplish, poker-like pin. Most people regard this hood as the flower of the cuckoo-pint, but it is really only an outside covering. If we tear it carefully aside, we shall find that the real flowers, in great numbers, are clustered round the lower part of the pin. Looking at the hood we shall see that it has a sort of waist, which divides the open upper part from the closed lower part, and, inside, the two parts are farther separated by a fringe of hairs standing out from the pin, or pintle, as it is named.

The flowers are below these hairs,

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very small, and without either sepals or petals. First there is a crowded band of stamens, and below these a similar band of crowded pistils. The hairs of the fringe above them all bend slightly downwards. The pistils are mature before the stamens are ready to shed their pollen; and those who have carefully studied the plant and its peculiarities tell us that when the pistils are ready the cuckoo-pint sends forth an unpleasant odor, which is attractive to certain small hairy-winged flies, who fly to it, and seeing the purple pintle, think it is something in which they can lay their eggs.

Finding out their mistake, the flies follow the scent to the lower part of the hood. The fringe of hairs bends to let them pass, but springs back at once to shut them in, for the hairs will not bend upwards. When autumn comes, we see the result of the work of these little flies in the bright red berries clustered around the remains of the pintle.

THE BUTCHER'S BROOM, ONE OF THE EARLIEST FLOWERS

One of the earliest flowers to appear in Great Britain is the butcher's broom, which may be looked for at any time between November and March. The plant is a prickly shrub, whose leaves are reduced to thin scales, that soon drop off and can rarely be found. But, instead of leaves, the butcher's broom has flattened out its twigs until they are egg-shaped, with a very sharp, hard point at the upper end. Most people take these for leaves, but if we find the plant in blossom we shall see that the flowers come out of the centre of these flattened twigs, which are known as cladodes. No plant produces flowers from its leaves. The flowers are not more than a quarter of an inch across, and consist of three sepals and three petals, because they belong to the lily family. They are pale greenish-yellow with a violet-purple centre.

The stiff, prickly cladodes and the red berries have caused the plant to be called in some places the knee-holly. Underground there is a thick, fleshy creeping stem, or root-stock. This is the only shrubby lily in Great Britain.

THE DAFFODIL, CALLED DAFFYDOWNDILLY BY THE POETS

In some British woodlands, in March or April, we may come across great spaces that are turned to gold by the nodding trumpets of the daffodil, or Lent lily.

"When daffodils begin to peer,—
With, heigh! the doxy o'er the dale,—
Why, then comes in the sweet o' the year:
For the red blood reigns in the winter's pale."

So sings a rogue in the "Winter's Tale," and over and over again do the poets refer to the early blossoming of the daffydowndilly.

Though it looks more like a lily than does the butcher's broom it does not belong to that family but to the Amaryllis family, to which the snowdrop also belongs. The long strap-like leaves, with straight sides, spring from a pear-shaped bulb, and from their middle rises the tall pipe-like stem, or scape, bearing a single bud, that is covered by a papery skin, or spathe.

As the bud swells, this wrapper is split down one side and pushed back. There are three sepals and three petals joined together at their base, but the six of them are alike in form and color, and they are collectively known as the perianth. This is of the beautiful pale yellow tint that is so familiar to us in the primrose; but the mouth of the perianth-tube has grown out into a rich yellow trumpet with a toothed and crinkled mouth. There are six stamens and one pistil.

THE FAIR PALE PRIMROSE, LOVELIEST OF SPRING FLOWERS

The rather pale primrose, "the firstling of the year," comes with the daffodil, and is the most renowned of the primrose family. It has a salver-form corolla, with a widely flaring, five-parted brim. Five stamens spring from the tube of the corolla; sometimes from near its base, with a long pistil, sometimes from near its top, with a short pistil. In the latter case they are called "thrumeyed," in the former, "pineyed." The lower stamens, in the one form, are just about on the same level as the stigma in the form with a short pistil. Thus a bee, down-thrusting his proboscis in the one, gets it well dusted with pollen in just the place to have it brushed off by a pistil in a similar position, and the upper stamens powder the proboscis for the long pistil. "Hence we see that by this beautiful arrangement, insects must carry the pollen of the long-styled form to the short-styled, and vice versa."

THE HAREBELL

The harebell, with its pretty little blue flowers, is the true bluebell of Scotland. Some people spell the name harebell, saying that it grows where hares live; but the true name of the flower is heather-bell.

THE WILD THYME

The fragrant thyme, with its rose-colored flowers, was formerly regarded as a cure for "melancholy and frenzy," and used as medicine. It is much visited by bees. The leaves are small and egg-shaped.

THE HONEYSUCKLE

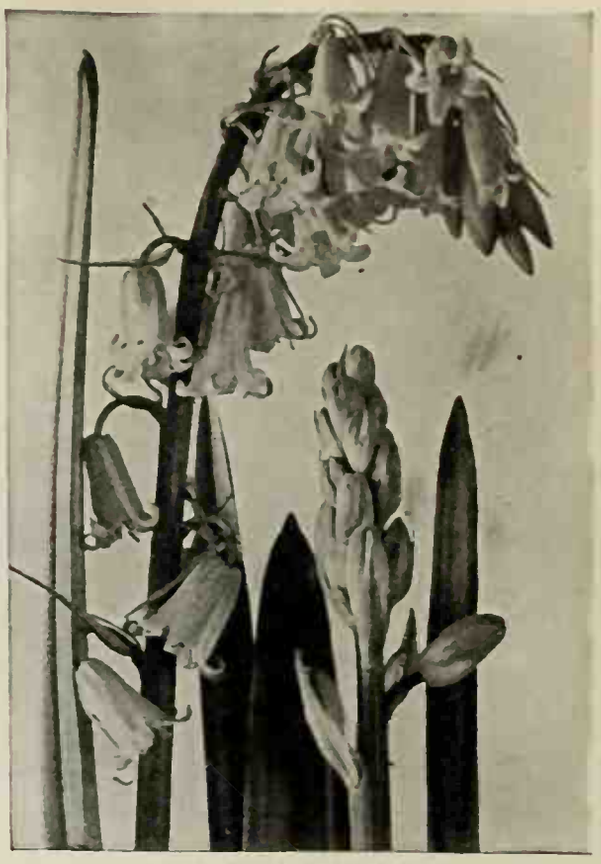
Few flowers are more deliciously fragrant than the honeysuckle, or woodbine, which in some parts of Scotland used to be placed in cowsheds to prevent the cattle from being bewitched. The berries are crimson.

THE WOODRUFF

One of the daintiest flowers found in shaded dells is the woodruff, with its clusters of little white cross-shaped blossoms. When dry, the plant is very fragrant, and is used by country people to pack with linen.

THE PRIMROSE

No wild flower is better known than the simple, beautiful primrose. It is abundant in early spring before other flowers are out, and its name means "first rose."



THE WILD HYACINTH

This lovely spring flower drapes curtains of exquisite blue on the openings of the woodlands in the British Isles, in the months of April and May.

THE DEADLY NIGHTSHADE

This plant merits its name, for people who eat the berries soon die. The flowers are in the form of dull purple bells. A preparation of deadly nightshade called belladonna is used by doctors and oculists.

THE HEARTSEASE

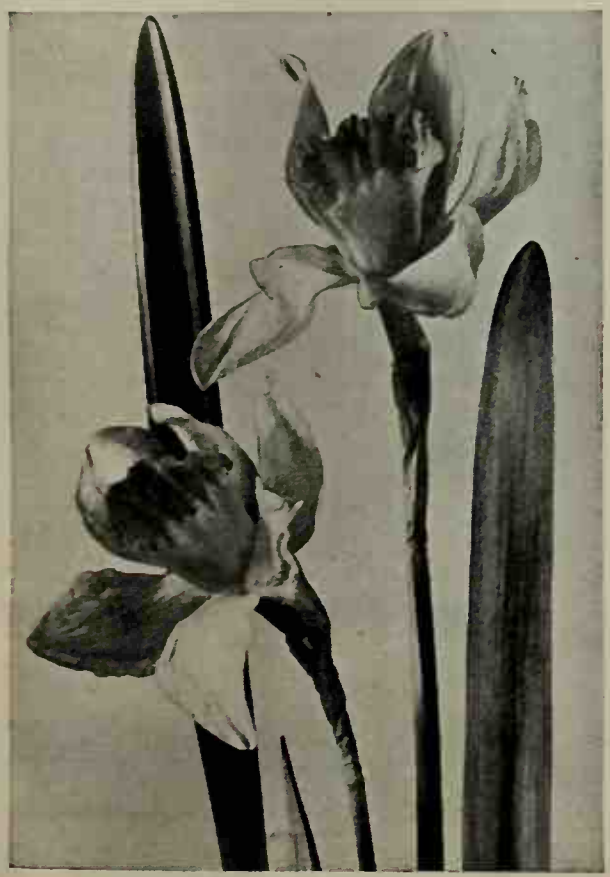
The heartsease, or wild pansy, is really a violet, but its color varies from white to yellow and purple, and usually it has two or three of these tints together. It was formerly used as a medicine for heart disease.

THE BUTCHER'S BROOM

The butcher's broom is so called because butchers used to preserve meat from rats and mice by covering it with this plant. The small greenish-white flowers are succeeded by very attractive bright scarlet berries.

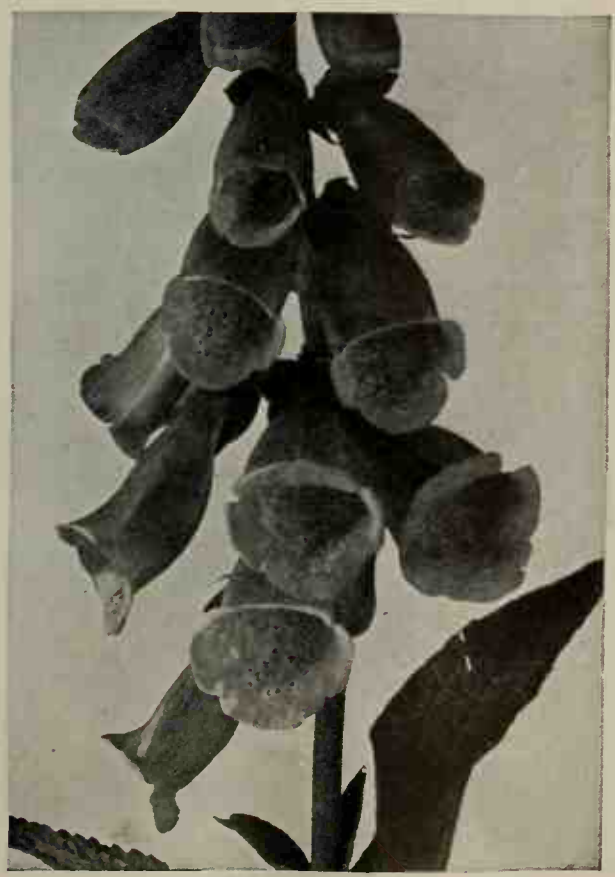
THE COMMON RED POPPY

The red poppy is, perhaps, the most brilliantly colored British flower; in fields of grain, where it grows abundantly, its bright scarlet flowers form a striking contrast to the golden waving grain.



THE DAFFODIL

Where the daffodil is found it grows in abundance, and the poet Wordsworth wrote of this flower, "ten thousand saw I at a glance." Country children are fond of "going daffying," as they call daffodil-picking.



THE FOXGLOVE

The handsome, stately foxglove, with its flowers like crimson bells, has many names, such as thimble-flower, fairy's petticoat, and fairy-cap. Foxglove means folk's or fairy's glove. The leaves are broad and long.

THE GOLDEN FLOWERS OF THE COLT'S-FOOT

Another early flower that in England we may find growing in the untidy corners of a meadow, or under a hedge, is the colt's-foot, so called because its roundish large leaf is the shape of a young horse's hoof. But we shall rarely see its leaves until its flower-heads have turned into small clocks, or puffs, something like those of the dandelion. Each flower-head looks like a golden daisy, but it has a much longer stalk than a daisy, and its yellow straps are extremely narrow. It has a stout root-stock, which creeps underground, and sends off burrowing runners, so that we shall find it usually growing in extensive patches.

THE LADY'S SMOCK, OR CUCKOO-FLOWER, OF THE MEADOW

In April and May we shall find the damper parts of the meadow covered with the lady's smock, "all silver-white," or cuckoo-flower or milkmaid, as it is variously called. The four-petaled flowers that, in spite of Shakespeare, are sometimes mauve, are of similar form to those of the wallflower, and the two plants belong to the same family, but the leaves are very different from those of the wallflower. The flowering stem is not sent up until spring, and on it there are much shorter leaves with the leaflets long and slender instead of round. The seeds are in long slender pods like those of the wallflower.

THE COWSLIP, BELOVED RETREAT OF THE FAIRIES

About the time the milkmaid is in flower, we ought also to find the cowslip. Its near relative, the primrose, is a plant of the woods, and is not particular as to the kind of soil, so long as there is plenty of leaf-mold above it. But the cowslip is fond of heavy soils, such as clay-loam and chalk-loam; consequently it is not to be found on light sandy soil, but is a distinct meadow plant. In some districts the meadows are thickly studded with clumps of cowslip, their yellow flowers standing high above their rosettes of leaves.

The cowslip flowers grow in a cluster right at the summit of the juicy flower-stem, which has no leaves at all, and is therefore called a scape. The five sepals are united into a calyx, and the five petals into a corolla, the teeth of the calyx and the lobes of the corolla showing the number of parts of which they are made up. There are five stamens attached to the corolla-tube, and the pistil has a rounded stigma like the head of a pin. As in the primrose there are two kinds of flowers, one with the anthers of the stamens almost closing the mouth of the corolla-tube and the stigma almost half-way down the tube, and the other with the stamens half-way down the tube, and the stigma at its mouth. All the flowers on one plant are of one kind only, the two forms never growing on the same plant.

The "cowslips wan" are the legendary retreat of fairies, who creep into them during showers.

THE FRAGRANT BLUEBELL OF THE ENGLISH POETS

Americans are likely to be puzzled by the frequent references to bluebells in English books. On this side of the water, the bluebells of Scotland are those that we think of first,—those nodding campanulas that dance not only on the heaths of Scotland, but on our northern cliffs, and rocky hillsides. However, in England, quite another flower is meant, the delicate hyacinth-like, fragrant squills that we often find in our gardens—generally known as scillas—and that, blooming very early in spring, "purple all the ground with vernal flowers."

THE HAREBELL, OR HEATHER-BELL OF SCOTLAND

"Mourn, little harebells o'er the lea," cries Burns, referring to the flower that is the darling of Scotland, that overtops the heaths and the heather. Elsewhere he speaks of "heather bells," which is the proper name for them; but the Scots shortened the sound into hea'er-bell, and Englishmen have got into the way of spelling it harebell. The pendent position of the harebell not only favors the bees which alight by clinging to the pistil and reaching far into the bell to get at the nectar at the base of the stamens, but prevents undesirable visitors from entering. It also, by forming a roof, protects the pollen from rain.

And this is very important, for the whole tribe of bell-flowers, or campanulas, are capable of self-pollination, so that if insects fail to cross-fertilize them they can still perfect the seed. Other campanulas are also called bluebells. One kind having run wild, sends up tall spines of violet bells, along shady roadsides.

THE BLACK BRYONY

This is a climbing plant that twines round the support by which it rises. The flowers are yellow-green, and the juicy roots are sometimes used to cure bruises.

THE PURPLE HEATH

This plant, known also as the fine-leaved heath, is the commonest of all the British heaths. It grows as a bush, with narrow leaves and reddish-purple flowers.

THE CROSS-LEAVED HEATH

This heath is more general than the purple heath, but it does not grow so profusely, and is therefore less known. It gets its name from its leaves growing in fours round the stem and taking the form of a cross.

THE COMMON BROOM

The broom has been described by the poet as "yellow and bright as bullion unalloyed." Where other plants will not thrive, it clothes the landscape with beauty. The broom is often confounded with the furze.

THE DELICATE WHITE FLOWERS OF THE WOODRUFF

The blooming of the harebells indicates the on-coming of summer, but, previously, along the narrow roads, through the woods where the fallen leaves have made a thick layer of leaf-mold, we shall find in May the charming woodruff, whose pale, thin root-stock runs through the mold and sends up square, brittle stems that bear "ruffs" of polished, lance-shaped leaves that stick out equally all around. Above the several ruffs are delicate sprays or cymes of very small, pure white flowers, funnel-shaped with four spreading lobes around the mouth.

If we gather a handful of the stems and put them in our pocket we shall find, as they dry, that they give out the pleasant odor of new-mown hay. It is occasionally found here as a fugitive from Europe, and resembles our climbing bed-straws, which belong to the Madder family.

THE STATELY SPIRE OF THE FOXGLOVE

Near them, perhaps, will shoot up into tall spires, "stately foxgloves fair to see," from among their large wrinkled leaves; and more than half of the four-foot length of stem is covered with the large purple-spotted crimson bells. The stamens and pistil are so carefully placed upon the upper wall that the portly bumble-bee, as it crawls in to get at the nectar, cannot fail to bring and carry off the pollen; while smaller insects are kept out by fringes of long hairs that stick in their faces. One foxglove plant produces a million and a half of seeds! There is much questioning as to the origin of this name. In several languages, the likeness of each flower to a glove-finger, or a thimble has been noticed, and in England it was supposed that fairy-folk donned them for headgear, while witches used them for thimbles. A useful medicine, digitalis, is extracted from the velvety leaves of the foxglove, although the plant, as a whole, is poisonous.

THE DEADLY NIGHTSHADE, OF WHICH WE MUST BEWARE

Another poisonous plant, but also medicinal, is the deadly nightshade, and all must beware of touching its big, black, cherry-like berry. This plant is bushy, about three feet high, with broad oval leaves. The drooping flowers are bell-shaped, greenish purple in color, and are produced singly. The whole plant is poisonous, and even the plucking of a spray may cause trouble to our eyes, so we must not touch it.

THE HEARTSEASE, WHICH RESEMBLES THE PANSY

But the little heartsease is not poisonous. Its flowers are seldom much more than an inch across, and often smaller; their shape and markings are just like garden pansies. At the base of the leaves there appear to be smaller leaves, but they are really stipules. In the pansy they are large and leaf-like, so they are commonly looked upon as leaves. Usually the petals are white with yellow and purple lines, but sometimes the upper petals are purple and the lower ones yellow.

The purple lines all run to the entrance to the nectar-tube, where there are two yellow spots, so that long-tongued insects shall not miss the way.

THE WILD THYME IS THE HAUNT OF THE BEES

"I know a bank whereon the wild thyme grows," quoth Oberon, and a wonderfully odorous and bee-haunted bank it doubtless was. While it grows in its evergreen low tufts it is very fragrant and pretty. Even its pale flowers standing thickly at the tips of the branches are of a pleasing "rosy" tint. The garden-thyme is very similar but comes from the Mediterranean shores. It is one of the aromatic mint family.

THE SCARLET POPPY OF THE GRAIN-FIELDS

The typical flower of the British grain-fields is the scarlet poppy. In June, when the wheat stalks have not yet reached their full height, many grain-fields appear from a distance to have nothing but poppies in them, and are a sheet of blazing scarlet.

THE GUELDER ROSE, THE ANCESTOR OF OUR SNOW-BALLS

Last of all, we will mention the charming guelder rose which attracts attention to its fruit-bearing treasures by the circle of gay, but otherwise useless, flowers. By gradually increasing the number of these snowy, sterile florets, the florists have built up the white globes that are so familiar in old-fashioned gardens. The picture of this flower is on page 4355.

THE NEXT NATURE STORY IS ON PAGE 4757.

THE FLOOD AT LINTON FALLS

CONTINUED FROM 4601

SWOLLEN to twice its usual size by long-continued rains, the River Wharfe raced between its banks with a noise like thunder. At Skipton it was no longer a peaceful river, but a wild torrent—grand, indeed majestic, in appearance, perilous to a degree to any who might come within the sweep of its impetuous course.

Heedless of all but play, two little boys were amusing themselves on the bank. Occasionally their laughter rang out on the air as they tumbled about, one on top of the other. Then they would pick themselves up, and off they would go again.

Suddenly, one of them, a child only five years of age, slipped and fell into the torrent. In a moment he was swept away and carried downstream with great swiftness.

The screams of his companion attracted the attention of Kate Verity, a girl in a mill close by. Throwing down the book she was reading, she rushed out to see what was the matter. A glance was sufficient to show her all that had happened. With amazing quickness, she decided what was best to be done. To have plunged into the river at that point was useless, for by this time, brief as was the period that had elapsed, the child had been carried at least a hundred yards down the stream. Promptly the plucky girl set off, running along the bank in pursuit. Barely thirty feet above the terrible Linton Falls she came level with him. A few yards more and nothing could save the boy from being carried into the white tumbling foam and dashed to pieces on the sharp rocks below.

The girl did not hesitate for an instant. Into the rapid current she plunged, as shown in the picture above, and caught the boy as he came sweeping downward. Then there followed a terrible struggle. The force of the water seemed to be irresistible.

The girl, however, knew well what she was about. Throwing the child across her shoulder, she struck out; the current held her, and for a while she made no headway. But there was no hurry, no fear; not once did the steady, strong sweep of her stroke give way to haste or excitement. Slowly, inch by inch, as it seemed, she forged her way towards the bank. More than once she was carried against a rock, and her destruction seemed imminent; but she came through without mishap, and was soon near enough to the bank to be dragged out of the water, almost exhausted, but still clutching the rescued boy.

For this gallant act, which so fortunately resulted in a successful rescue, the brave Yorkshire lass, Kate Verity, was awarded the bronze medal of the Royal Humane Society.

THE JUDGE WHO IMPRISONED A PRINCE

WHEN King Henry V. of England was a youth, he and his brothers grew tired of the irksome ways of the court, and scandalized the king, their father, and the staid courtiers by their practical jokes and mad frolics.

Prince Henry often grieved his father by his reckless behavior when in the company of his gay associates. He would disguise himself as a thief, and set upon and rob the men who had collected his father's rents. But he would reward honest, brave people, and his wild pranks seem to have been due more to boyish love of mischief and adventure and to boisterous spirits than to any real liking for ill-doing. However, his conduct and that of his brothers ill became royal princes, and Prince Henry's familiarity with some of his future subjects vexed his royal father very much.

There is one story about Prince Henry, or Prince Hal, as the people liked to call him, which not only redounds to his credit by showing he could be staunch to a friend in trouble, and take punishment with good grace, but tells how a judge put justice before the favor of man. Prince Henry's brothers, Thomas and John, once supped far into the night with some of their boon companions, and the feast ended in a riot, at which the city authorities had to interfere. The princes were angry at that, and as a result the Lord Mayor and aldermen were summoned before the king. He, however, soon dismissed them when they said they had merely done their duty in stopping a riot.

It was during another wild freak of this kind that one of Prince Henry's followers was charged and sentenced to imprisonment. When the prince heard what had befallen his favorite, he came to the judge, Chief Justice Gascoigne, and ordered him to release his follower. But the judge, who feared the anger of the royal youth less than he feared the reproach of his own conscience, looked at him sternly, and told him justice must be done, though, at the same time, if the king willed, *he* could pardon the prisoner.

PRINCE HENRY GREW VERY ANGRY, AND DREW HIS SWORD UPON THE JUDGE

When Prince Henry saw that he could not overawe the judge, he grew very angry, and drew his sword on him threateningly. Then the judge called on him to recollect himself, and declared that he was there to fulfil his duty in place of the prince's own father, and that in his name he adjured him to

change his wilful conduct and set a good example to those who would one day be his own subjects.

"And now," he concluded, "because you are guilty of disobedience and contempt of this court, I commit you to the King's Bench Prison. There you will stay until the king, your father, orders your release."

The hot-tempered prince acknowledged the justice of the judge's words, and, laying his sword down, bowed to the courageous man who had sentenced him, and was then taken off to prison. It is said that when the king heard of what had occurred, he expressed his happy fortune in having for one of his judges a man who was not afraid to administer justice, and for a son a youth willing to submit to it.

Shakespeare, who wrote a great deal about Prince Henry in his plays, makes the king, his father, say these words:

> Happy am I, that have a man so bold,
> That dares do justice on my proper son;
> And not less happy, having such a son,
> That would deliver up his greatness so
> Into the hands of justice.

Prince Henry afterwards treated Judge Gascoigne with much respect, recognizing that if he could keep so strictly to enforcing the laws of the country, even against the heir to the throne, who in the natural course of events would one day be his sovereign, then he would not regard the favor of any man, but seek to do his duty to all.

When Prince Henry did come to the throne, he justified the people's trust in him, and Judge Gascoigne was one of the upright men he consulted. Shakespeare puts these words into the mouth of Henry V., when addressing the judge:

> . . . . Still bear the balance and the sword;
> And I do wish your honours may increase
> Till you do live to see a son of mine
> Offend you, and obey you, as I did.

THE BRAVE SCHOOLGIRL IN ENGLAND

THE deeds of many humble heroes and heroines are quite unknown, but they are all worthy of record. Julia Hatcher, an English schoolgirl, lived at Moorside, a lonely spot near Blandford, Dorset. One day, while she was at work in her house, she was startled by the sound of screaming.

Going to the door, she was horrified to see a huge bull tossing a boy in a field on the other side of the road. Again and again the infuriated animal rushed at the prostrate figure, lifted him on its terrible horns, and threw him backwards high into the air, so that he fell heavily to the earth.

The lad's death seemed but a question of moments. Realizing this, Julia Hatcher rushed out to save him. It was a perilous errand, and one which seemed certain to prove fatal, for the furious bull was in no mood to permit interference.

But the girl's presence of mind was equal to the occasion. She remembered that bulls always shut their eyes when stoned, so as she hurried along she picked up a large handful of stones that lay directly in her path.

The moment she got within range she began to bombard the bull. Every stone did not take effect; some went very wide of the mark. They served, however, to divert the animal's attention from the boy—which, after all, was the main object. All the while she kept advancing till she came so near that it was impossible for her to miss her mark.

The bull resented these attentions, and several times he charged with lowered head. The girl stood her ground undaunted, meeting each fresh rush with a well-sustained shower of stones.

At length the bull paused, glared about him for a moment, and then turned tail. Prompt to improve her advantage, Julia followed, pelting him vigorously till he took himself off.

The courageous girl now turned her attention to the boy, who was by this time unconscious. He looked in a terrible condition. His clothes were torn to rags, and he was frightfully bruised and battered. Fortunately, no bones were broken. After a great deal of trouble, she restored him to consciousness. Eventually he recovered from the ill-effects of that terrible day, and quite regained his health.

Had she not acted so courageously and promptly, and had she not remembered that bulls close their eyes when stones are thrown at them, there is no doubt that the boy would have lost his life. For this brave action in facing a bull she was awarded a bronze medal.

THE NEXT GOLDEN DEEDS ARE ON PAGE 4745.

A HEAD THAT CAN NEVER BE FORGOTTEN

Here we see the sculptor, Gutzon Borglum, in his studio, putting the final touches on the colossal head of Lincoln, now in the Capitol at Washington. No one else has succeeded so well in showing one side of the character of this great man. It is a sad face, apparently feeling the weight of all the terrible war, with the suffering it brought. A copy of the head in bronze is in the College of the City of New York.

Robert Louis Stevenson, by Augustus St. Gaudens.

SCULPTURE IN AMERICA

CONTINUED FROM 4575

IN this big storehouse of a world are many kinds of beauty. The painter cares most for beauty of color, for the exquisite variations in light and shade and atmosphere. Beauty of line and form are what the sculptor feels most keenly. His longing is to reveal the beauty which he perceives in objects in their mass.

Painters were our pioneers in art. They had inherited the artistic traditions of old England, where for long there were no important sculptors. For many years it was impossible for a would-be sculptor to get necessary training in this country. He had to seek it in Italy, for at home he met with little sympathy. Puritan prejudices were against him. He saw no sculpture, nor was there opportunity to study modeling from life until late in the nineteenth century. The first casts from the antique brought to this country aroused indignant protest from our austere forefathers. Nor was there any available marble to be had here as yet. Nothing was known about casting bronze.

In spite of all these difficulties, men of vigorous talent forced their way to success. An occasional visit from a foreign sculptor helped their cause. Thus Houdon came from Paris, in 1785, commissioned to make a statue of George Washington, which is now in Richmond. This is the only statue of the "Father of His Country" made from life. Copies of it are in several cities.

William Rush, born in Philadelphia in 1756, won distinction with cleverly carved figureheads for ships—The Genius of the United States for the frigate United States, the Indian Trader for the William Penn, Nature for the Constellation, and many others, some of which are still in existence. He was one of the founders of the Pennsylvania Academy of Fine Arts.

Horatio Greenough is not only one of the best known of our early sculptors, but typical of many who sought inspiration in Italy. Born in 1805, son of a successful Boston merchant, he was surrounded by the best social influences of his day. A marble statue in his father's garden, copy of an antique, inspired his desire to become

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a sculptor. He read art books at the Boston Athenæum, and a stone-cutter taught him something of carving marble. As soon as he had been graduated at Harvard he went to Rome, where he found the great Thorwaldsen ready to lend him a helping hand. At the famous quarries of Carrara he learned to handle marble. He went from success to success, obtaining many important commissions, paying home visits but spending most of his life in Florence. There his studio became a meeting-place for gifted people, and American visitors took home from it a wider understanding of sculpture.

AN UGLY STATUE OF WASHINGTON AS A ROMAN SENATOR

One of Greenough's best known pieces is a George Washington in classic attire which is now in the Smithsonian Institution, in Washington. It formerly stood on the Capitol grounds. To our eyes it is hideously ugly, and we wonder that any one could ever think it proper to represent Washington in the garb of a Roman Senator. Greenough's work, like that of most of his contemporaries, suffered from his unbounded enthusiasm for ancient art. As a result, our early sculpture is largely imitative. The ardent disciples tried in vain to catch the inspiration of the old Greek and Roman masters. They failed to realize that no really great work could be produced until they trusted their own knowledge of life.

THE MAN WHO MODELED THE GREEK SLAVE

Hiram Powers, born in the same year as Greenough, had a harder time becoming a sculptor. His parents were poor, had many children, and Hiram had early to take care of himself. His skill in modeling led to employment in a dime museum, where he made wax figures. From this he turned to portrait busts, with which he was very successful. When thirty-two he had saved enough to go to Florence, where he found the atmosphere so congenial that he remained. The Greek Slave, copies of which are in many art museums, is his most famous work, and in its day received the highest commendation. It is lovely and pleasing, although to modern taste most of Powers' work seems somewhat tame. He has a genuine gift for portraiture, as is shown by his vigorous busts of Franklin, Webster, and others.

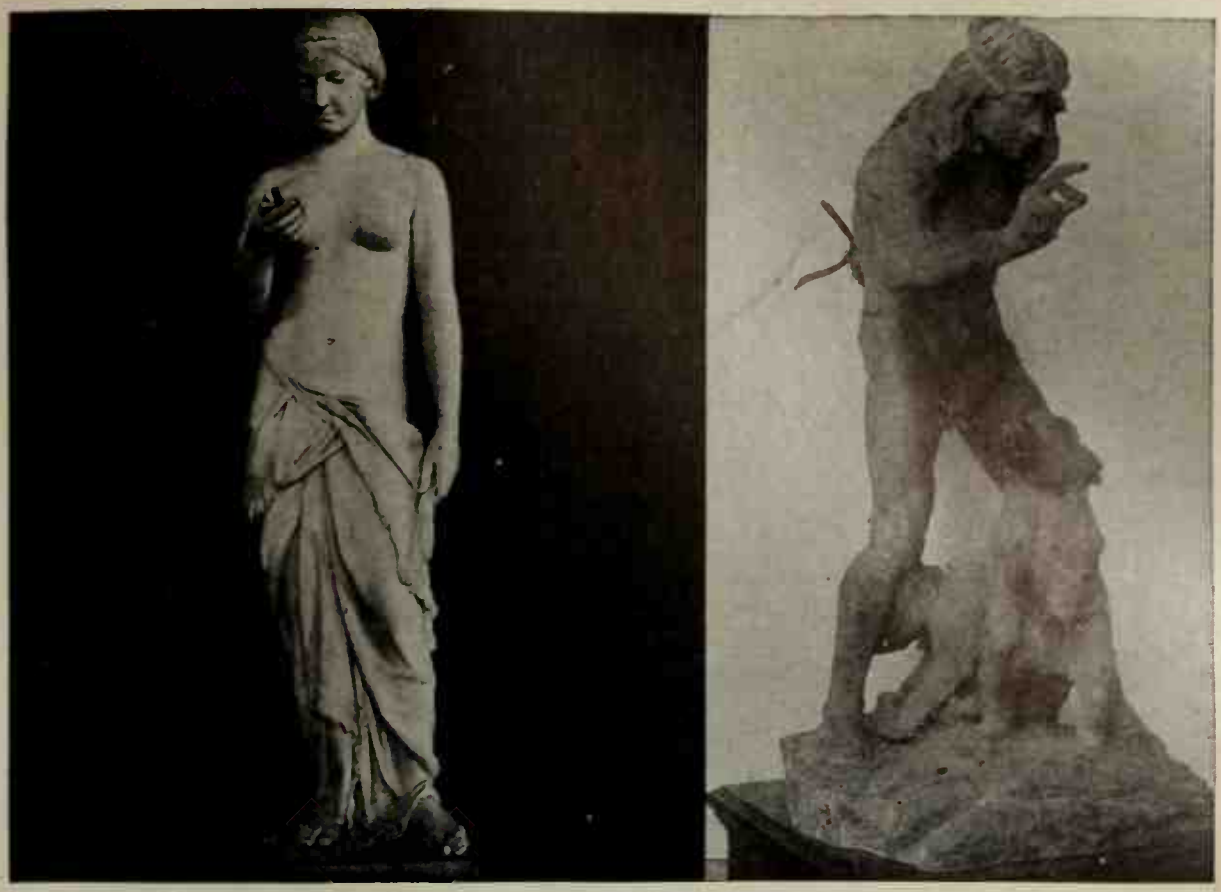
Thomas Crawford was born in New York, but also sought training in Rome, and was heartily admired by Thorwaldsen. He modeled the Liberty on the dome of the Capitol at Washington, and made good statues of Patrick Henry and Thomas Jefferson, now in Richmond. His gently imaginative work is more an individual expression than that of most of his predecessors. The Dancing Girl is perhaps the most popular to-day. He was the father of F. Marion Crawford, the writer.

Gradually American sculptors were coming into their own. They had feasted eye and spirit on ancient sculpture. They had learned their craft in foreign studios. The people, too, were becoming more appreciative. Copies and photographs were familiarizing them with antique sculpture, and they began to enjoy its beauty. It no longer antagonized them. Sculptors began to discover that they could find success at home.

THE SON OF A JUDGE BECOMES A SCULPTOR

For many years William Wetmore Story enjoyed high international rank. During his long residence in Rome, this brilliant and versatile man, writer and musician as well as sculptor, added prestige to his profession. Born in Salem, Massachusetts, in 1819, he graduated at Harvard, and studied law before deciding to be a sculptor. His father was Justice Joseph Story, of the Supreme Court of the United States. He went to Rome in 1851, where his home soon became widely known as a gathering-place for the most distinguished people. Perhaps the influence of his enthusiasm and brilliant mind was even greater than that of his work. His Cleopatra, Libyan Sibyl, Semiramis and many portrait busts are among his most highly esteemed works. His statue of Francis Scott Key, author of the Star Spangled Banner, stands in Golden Gate Park, San Francisco, California. His son, Julian Story, is a successful artist and lives in Philadelphia.

Erastus Palmer, born in 1817, is one of the many fine examples among our early sculptors of irrepressible talent finding expression. He was a young carpenter in Utica, New York, self-taught in art, when he cut a cameo portrait of his wife so cleverly that it led to many



The first figure, by Erastus Palmer, is sometimes called The White Captive, though some have called it The Indian Girl. Notice its stiffness compared with Paul Wayland Bartlett's Bear Tamer, to the right. The work of the early sculptors of the United States nearly always shows this awkward stiffness.

The bust of Andrew Jackson, by Hiram Powers, is in striking contrast with the Emerson by Daniel Chester French, on the right. The sculptors feel the difference in the times as much or more than the painters do. Many of the earlier sculptors thought it necessary to show their subjects in classical dress.

commissions for cameo portraits. He is said to have made over two hundred in two years. Eye-strain caused by such fine work led him to turn to modeling in clay. A bust of one of his children, called Infant Ceres, was greatly admired, executed in marble, and exhibited at the National Academy of Design. From that time he was a successful sculptor. His White Captive, a graceful girlish figure, was considered one of the best things of the kind so far accomplished by an American. Palmer was especially successful with portrait busts of Alexander Hamilton, Commodore Perry, Washington Irving, and many others. He taught American sculptors an important lesson in self-reliance and that mastery of their art could be attained without foreign study. He was fifty-six before he saw Europe, and then he passed two years visiting the studios and treasures of foreign capitals.

THOMAS BALL, WHOSE PUPILS GENERALLY SUCCEEDED

Thomas Ball has told us in his interesting autobiography much of the conditions with which American sculptors had to contend before the Centennial Exposition. Born in Boston in 1819, the son of a house and sign painter, Thomas was employed as a boy in the New England Museum, where he found time to study drawing, engraving, and painting. His best talent, however, was for modeling, and his small figures and busts found ready sale. Shortly after his marriage, when he was about thirty, he took his bride to Italy, where they spent a happy two years learning much of his art, and enjoying the companionship of such gifted people as the Brownings and Hiram Powers. Among his most important works are the Washington in the Public Gardens, Boston; Edwin Booth as Coriolanus, in the Actors' Home, Philadelphia; the Emancipation Group, Washington; Daniel Webster, Central Park, New York. Mr. Ball has accomplished many works of different kinds, many commemorative monuments as well as imaginative pieces. Everything he did showed a vigorous grasp of his subject and a high degree of technical skill. During his long career he exercised an educating influence upon American sculpture, and many of his pupils became distinguished.

Clark Mills, born in New York State in 1815, should be mentioned for having made the first American equestrian statue. This is the Jackson Monument in Washington. Mills had a sad childhood, early fatherless, brought up in the home of a harsh uncle. At thirteen he ran away and henceforth took care of himself. He had been farmhand, lumberman, millwright, and many other things before he began modeling in clay. He was about twenty, and although he had little or no training, was quickly successful, for his friends admired his work and gave him commissions. He had true Yankee ingenuity and overcame all difficulties by experimenting until able to accomplish what he wished. Thus he discovered a way of taking casts from the living face so that he could make likenesses cheaply, and this led to many orders. His bust of John C. Calhoun was purchased by the City of Charleston and brought him a gold medal.

HOW THE FIRST EQUESTRIAN STATUE IN AMERICA WAS MADE

The president of the committee having the erection of the Jackson Monument in charge, invited Clark Mills to submit a design for it. He had never even seen an equestrian statue, yet, undaunted, he set to work and his design was accepted. The committee furnished the bronze from old cannon captured by General Jackson, and Mills contracted to do the work for $12,000. A replica, that is, one just like it, is in New Orleans. It is a bad statue, and looks like a rocking horse, but it is a monument to Yankee enterprise and skill. From that time he was fully and successfully occupied. He modeled a large statue of Washington, now in the national capital, and cast Crawford's Liberty in bronze. If you wish to see how the statue of Liberty looks, ask your father to show you one of his Liberty Bonds. On every one of them is printed a picture of this statue.

William H. Rinehart, born in 1825, son of a Maryland farmer, had a hard time learning sculpture. He was stonecutter for a time, studying art in the night schools of Baltimore. When thirty he had saved enough to go to Italy. Upon his return he found himself so unhappy that he soon went back to Rome, where he spent the remainder of his life. Remembering his early hardships, he left money for a scholarship to help needy sculptors. By 1840 or 1850 many Ameri-

A REMINDER OF THE REVOLUTION

Just before the Revolution, the citizens of New England were organized into bands of Minute Men, who were ready to resist the British at a moment's notice. This fine statue by Daniel Chester French stands in Concord, Massachusetts, where, on April 19, 1775, the Minute Men resisted the British, leaving their ploughs to seize their guns. In another place you may read Longfellow's stirring poem of Paul Revere, who rode out from Boston to warn the sleeping farmers that the British were coming to destroy the military stores that had been collected.

Photograph, N. L. Stebbins.

can sculptors were accomplishing creditable work if not as distinguished as that which was to follow.

A WOMAN ENTERS THE FIELD OF SCULPTURE

We have one famous woman sculptor of this early time—Miss Harriet Hosmer. Born in Watertown, Massachusetts, 1830, she was a frail child, and her father, a physician, encouraged her in tomboy ways, hoping to make her strong. Harriet rode and rowed, hunted and skated, made collections of eggs and bugs, and had a free, happy time. She studied drawing and modeling with a Boston artist, and then, because anxious to study anatomy, went to St. Louis, where the Medical College was one of the few institutions of the kind then admitting women. In 1852 her father took her to Italy and there for seven years she studied in Rome. She soon became a distinguished sculptor and figure in the art world. Her little figure of Puck was immensely popular, and she was called upon for many copies of it.

Important names thicken in the history of American sculpture. It is impossible to give many of them even brief mention.

THE MAN WHO MADE A GREAT WASHINGTON

One of the first sculptors who broke away from the Italian influence was Henry Kirke Brown, born in Leyden, Massachusetts, in 1814. Though he studied in Italy, his later work is strongly American. His best work is the statue of Washington on horseback, which is in Union Square, New York. The greatness of his subject seemed to inspire the artist, and this work is much superior to his other statues.

John Quincy Adams Ward, born in Urbana, Ohio, in 1830, had the childhood of a farmer's boy. His first modeling was the figure of an old negro done with clay from his father's farm. While visiting in Brooklyn he became a pupil of H. K. Brown, and worked with him for seven years. He helped to make the Washington statue of which we spoke above. He could not have fallen into better hands, for under Mr. Brown's careful training he became an expert in handling both marble and bronze. His Indian Hunter, now in Central Park, was his first noteworthy work. Of his many achievements his Freedom is perhaps the best known. In 1896 Mr. Ward was elected president of the National Sculptors Association. His statue of Washington on Wall Street is shown in another place. He perhaps made more portrait statues than any other American sculptor. Though he lived to be eighty years old he worked to the last, and his work showed no signs of loss of skill.

HOW TEACHING HAS BEEN PASSED DOWN

Daniel Chester French, one of our most highly esteemed sculptors, was born in Exeter, New Hampshire, in 1850. Miss May Alcott, so well known as the Amy of Little Women, gave him his first lessons in modeling, for which she lent him her tools. He was nineteen then and had discovered his talent in carving turnips. His father and stepmother gave him every encouragement, and he had later the great advantage of studying in the Brooklyn studio of J. Q. A. Ward.

THE MINUTE MAN, WHICH CATCHES THE SPIRIT OF NEW ENGLAND

He was only twenty-three when he accomplished successfully his first important commission—The Minute Man, which stands in Concord, Massachusetts, to mark the site of the battle of Lexington. Among his achievements are the Gallaudet Group, showing the famous doctor of the deaf teaching tenderly a little pupil; the statue of John Harvard at Harvard University; the Alma Mater at Columbia University; The Angel of Death and the Young Sculptor. He excels, too, in portrait heads. He has done some important pieces in collaboration with Edward C. Potter, the distinguished sculptor of animals. Mr. French's work is noted for serene beauty and distinction, and for a quality finely sympathetic which endears it to the general public.

Gradually Rome ceased to be the one place for which all young sculptors longed. For many years now they have been going to Paris, more and more, to the Ecole des Beaux Arts and the studios of Parisian sculptors. America is justly proud of Augustus Saint Gaudens, by critics generally ranked as our greatest sculptor. In him seemed to flower the accumulated influences of foreign craftsmanship, with striking individuality. He combined the sympathetic imagination and large conception of a poet with marvelous mastery of technique.

TWO FINE STATUES IN NEW YORK'S PARKS

The Indian Hunter, by J. Q. A. Ward, is one of the best statues in Central Park. Every muscle is tense as the hunter crouches, awaiting the moment to loose his half-wild dog and bound forward after the game. One expects the figure to come to life at any moment. This is one of Ward's earlier works, and is said to be the first statue erected in the park, which now has so many.

You have read of David Glasgow Farragut, of the United States Navy, in another volume of our book. Augustus St. Gaudens has represented him as he would stand on board ship. The pedestal, which adds much to the impressiveness of the figure, is by Stanford White. The figure stands in Madison Square, surrounded by high buildings, though you would not guess it from the trees in the background. Perhaps more people in the United States have seen work by St. Gaudens than by any other American sculptor.

SAINT GAUDENS, AMERICA'S GREATEST SCULPTOR

Saint Gaudens was born in Dublin, Ireland, in 1848. His mother was an Irish woman, his father a French shoemaker. They came to the United States when Augustus was a baby, and finally settled in New York. At thirteen he was apprenticed to a cameo cutter, with whom he worked for several years, devoting his evenings to the drawing classes at Cooper Union and the Academy of Design. All his life he was a tireless worker. When nearly twenty he was able to go to Paris, where with other men of genius he studied in the studio of Jouffroy. After three years in Paris, he went to Rome for three years more. In 1874 he returned to America and henceforth devoted himself to the important commissions which crowded upon him. For many years his studio at Cornish, set in the beautiful, rugged New Hampshire country, stood to American sculptors for the highest in ideal and craft. The amazing amount of his achievement, his unhalting succession of important works, show unvarying enthusiasm and power of concentration. Among his most representative pieces, making fine appeal both to cultivated and to ignorant people, are the Admiral Farragut in Union Square, New York; the Shaw Memorial in Boston; his Lincoln and Sherman; his relief of Robert Louis Stevenson; the poignant figure of Grief in the Adams Memorial, Rock Creek Cemetery, Washington; the grim old Puritan, Deacon Chapin; the buoyant Diana on the tower of the Madison Square Garden, New York. In all his work—low relief, statues, portraits, monuments—he has known better perhaps than any other American sculptor, how to touch the heart in revealing both the material and spiritual beauty of his subject.

A MAN WHO IS AT HIS BEST IN PORTRAITS

William Ordway Partridge is not only a sculptor, but in writings and lectures a distinguished teacher of his art. Born in 1861, a graduate of Columbia University, he studied in Paris and Rome. His talent, enriched by liberal education, has found refined and vigorous expression. Perhaps his portrait busts of Shakespeare, Tennyson, Shelley, Burns, Whittier, and many others, in their widely different interpretations of character, are as fine as anything Mr. Partridge has achieved. Two portrait statues stand on the grounds of Columbia University in New York City. They are Alexander Hamilton and Thomas Jefferson, and both are much admired.

THE MAN WHO ALWAYS LOVED TO MODEL ANIMALS

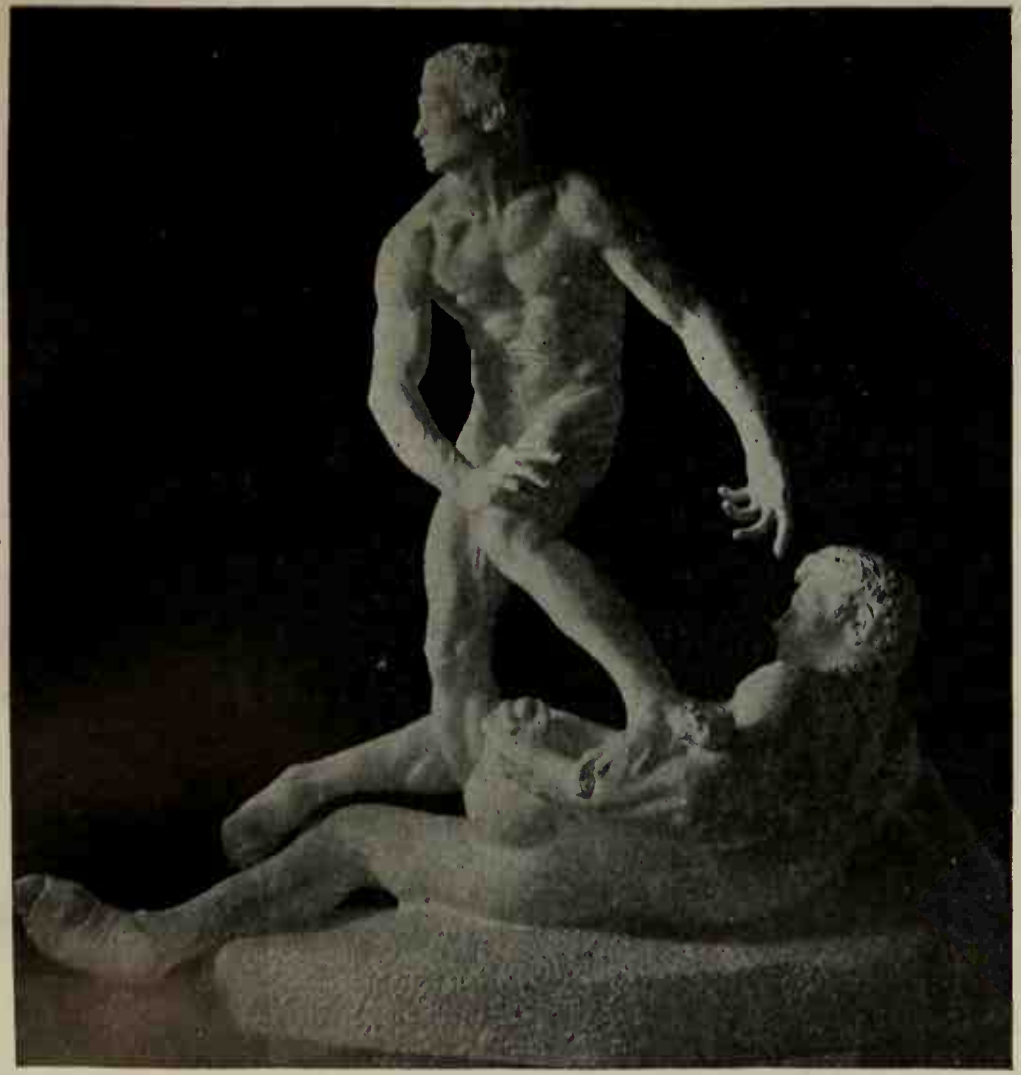
Paul Wayland Bartlett may be said to have inherited his talent; for his father was a sculptor and also a distinguished art critic. Paul was born in Boston in 1865. He received his training at the Ecole des Beaux Arts, Paris, which he entered at fifteen, working very hard, but finding time to attend a course on animal sculpture at the Jardin des Plantes. It was necessary for him to earn his own living from an early age, and this he did by making clever little models of animals. This early work is somewhat freakish and grotesque. Later he accomplished some finely dramatic models of animals, among which his Dying Lion and the Bear Tamer are highly esteemed.

He is a master in the art of bronze casting and his collection of bronze bugs, fishes, and reptiles attracted much attention in the Paris Salon of 1895. Among the important commissions he has executed are two of the circle of bronze effigies in the rotunda of the Congressional Library. His Columbus and his Michael Angelo are among his noteworthy works. They show the imaginative realization of the great sculptor, and the great discoverer, as well as a splendid vigor of execution. American visitors to Paris have reason to be proud of the young American sculptor whose equestrian statue of General Lafayette in the Place du Carrousel has been highly commended by leading sculptors at home and abroad.

THE MAN WHO WORKS HARD ALL THE TIME

George Gray Barnard is often claimed as our most original sculptor. He is distinctively American, seeking to reveal the greatness and promise, the crudity too, perhaps, of his native land. He is an out-of-door man. Born in 1863, in Iowa, much of his youth was spent roaming about the country studying the ways of birds and beasts and trying to model these in the local clay. Finally he went to Chicago, where for a time he

TWO GROUPS THAT HAVE PECULIAR SIGNIFICANCE



The group on the left is by George Gray Barnard and is entitled The Two Natures in Man. It represents the constant struggle between bad and good which goes on in every one of us, and in this struggle sometimes one conquers and then the other. The Memorial to Edgar Allan Poe, perhaps the greatest poet the United States has yet produced, which stands on the right, is by Richard Hamilton Park. Both may be seen in the Metropolitan Museum of Art, New York City.

worked with an engraver and then decided to become a sculptor. He entered the Chicago Art Institute and while there made a child's bust for which he was paid $350. With this small sum he went to Paris, where he lived in seclusion, working hard and living meagrely until he fairly earned success. In 1894 he was ready to exhibit his works, which aroused great interest and admiration. Those who clung to conventional methods were somewhat repelled by his daring innovations, but always his vigor and daring has won respect. Among his best known works are Brotherly Love, the Two Natures; the Hewer. He has for some years been engaged upon the sculpture for the Capitol of Pennsylvania.

He has modeled a statue of Lincoln for the city of Cincinnati, which has been much discussed. Some people say that he has made the great president look like an uncouth clown, while others see the soul of the great man under the unpleasing exterior. A copy of this statue was presented to the city of London.

TWO BROTHERS WHO HAVE WON RECOGNITION

Another of our younger sculptors, Solon Borglum, has won his fame by choosing characteristically American subjects. He was born in Utah in 1868, where his father—who had started life as a Danish wood-carver—had become a successful American physician. Solon had a wild and picturesque youth, roaming over the western prairie, becoming intimately acquainted with Indian life, and an expert cowboy on his father's ranches. For years he was a nomad, drifting rather aimlessly about the western country between Utah and the Pacific coast. At last he decided to study art, and with $64 in his pocket, went to Cincinnati. He excels in portraying animals and is master of the technical difficulties in conveying sense of action. He may be called the sculptor of the virile West and all that he does is stamped with the romance of the frontier. On the Border of White Man's Land, Stampede of Wild Horses, the Lame Horse, the Last Round Up, are among his important works.

His brother, Gutzon Borglum, has also won fame, chiefly by his monumental and ecclesiastical works. His colossal head of Lincoln is wonderful, and he has also done the Twelve Apostles for the Cathedral of St. John the Divine on Morningside Heights in New York City. The immense group called North America was made for the building of the Bureau of American Republics.

The Middle West has produced several of our best known sculptors. Charles H. Niehaus was born in Cincinnati, Ohio, of German parentage. He very early showed skill in drawing, and after studying at the Cincinnati School of Design went abroad to Munich. There he won prizes and received commissions so that he returned to this country well on the road to success.

THE YOUNG SPY OF THE REVOLUTION —SHOWN IN ANOTHER PLACE

Frederick Macmonnies stands in the van among our distinguished later sculptors. He has already shown amazing versatility in choice of subject as well as great technical skill.

Macmonnies was born in New York in 1863, the son of a Scotch business man. He was a sixteen-year-old clerk in a jewelry store when his talent for modeling became known to Saint Gaudens, who took him into his own studio. No better fortune than such a master could have befallen him. He proved a diligent pupil, working also in the night classes at the Academy of Design and the Art Students' League. Then he went to Paris to the Ecole des Beaux Arts. His work was aggressively bold and independent and from the start attracted attention as of great promise. In 1885 he took the highest prize open to foreigners. His first big piece of work, a Diana, won a mention at the Salon. It led to an order for the three bronze angels now to be seen in St. Paul's Church, New York. One of his most popular works is the statue of Nathan Hale, young martyr of the Revolution, bound, at the moment of his execution. It has called halt to many men and women hurrying through City Hall Park, New York. Macmonnies knows clearly what he wants to show. Of Nathan Hale he said:

"I wanted to make something that would set the bootblacks and little clerks around there thinking—something that would make them want to be somebody and find life worth living."

Macmonnies excels in vigor. His Bacchante suggests the joy of life to the most unthinking. The Columbian Foun-

tain, made for the World's Exposition at Chicago, is one of his successes. He was twenty-seven when this commission, with $50,000 to carry it out, was given him upon the recommendation of Saint Gaudens. He has modeled many other groups and monuments besides several equestrian statues.

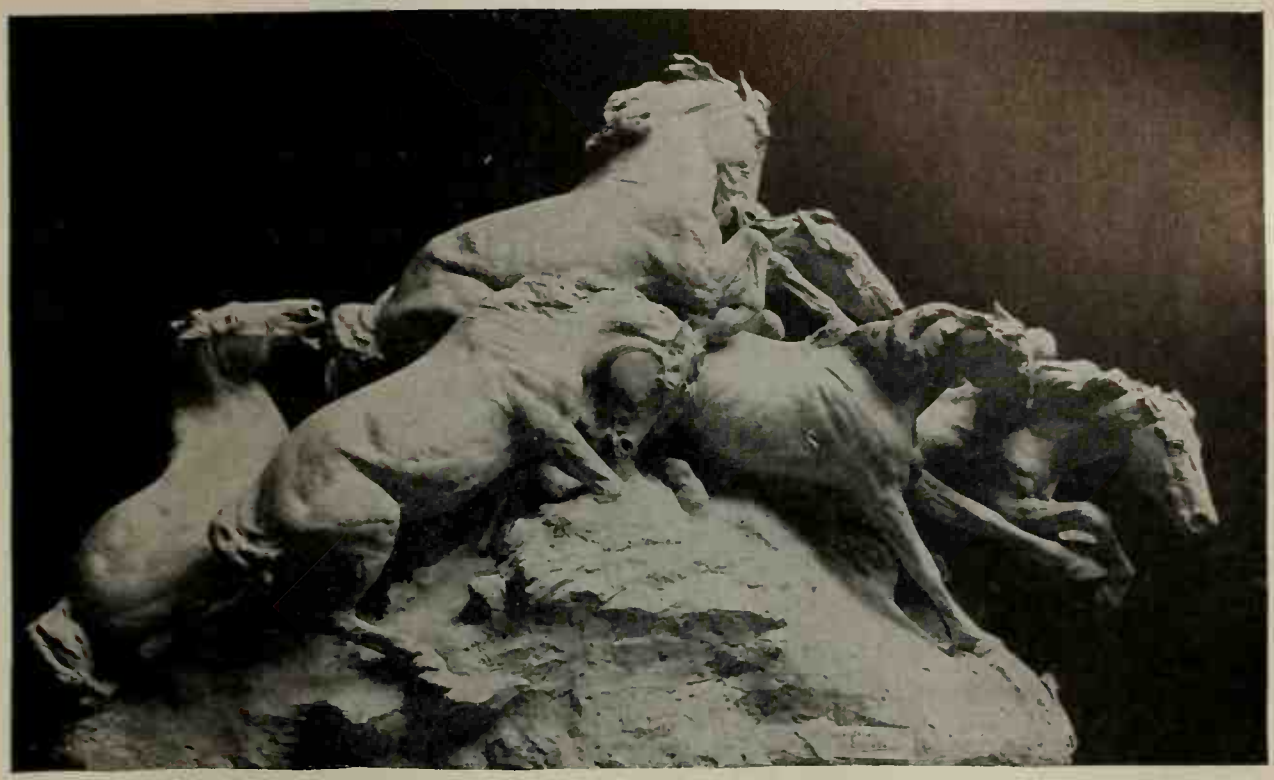
A MAN WHO MADE BEAUTIFUL DOORS

Herbert Adams, born in Vermont, in 1856, modeled the wonderful bronze doors of St. Bartholomew's Church in New York and two others for the Congressional Library in Washington. He has done many memorials for churches and has also made some portraits. The Bryant statue, which we show on page 5262, is his work.

He is no less noted for his imaginative statues of beautiful women. The most noted are St. Agnes, Primavera, the Rabbi's Daughter, and one of the young woman who afterward became his wife. All his work is graceful and executed with marvelous delicacy. He has been compared to the sculptors of the Italian Renaissance.

SOME OTHER MEN WHO SHOULD BE NAMED

There should be named Karl Bitter, who planned the sculpture for the great Expositions at Buffalo and St. Louis. Much of his best work is in the decoration of public buildings. He has also done several portrait statues which show both skill and talent of a high order. Then there is Lorado Taft, who is helping to make Chicago beautiful. The Spirit of the Great Lakes, and the Fountain of Time are two of the groups. We might go on to mention E. V. Valentine, F. W. Ruckstuhl, Bela L. Pratt, O. L. Warner, and many others. Nor must we forget Frederic Remington, who is better known as a painter, but whose figures of Western life are interesting. These are generally very small, statuettes in fact, but the cowboys, Indians, and horses are beautifully modeled, and are full of life and feeling.



There is an old Greek story of a King Diomedes who fed his mares upon human flesh until they became so savage that no one except their owner dared to approach them. Finally Hercules, or Heracles, as he is called in Greek, slew Diomedes and tamed them. This group, by Gutzon Borglum, is in the Metropolitan Museum of Art, New York. Copyright by Gutzon Borglum. Reproduced by special permission.

We have many able sculptors now. In studios and art institutions at home and abroad they have learned the mastery of their art, how to handle clay and marble and bronze. They trust their own inspiration and have ceased to be slavishly obedient to the art traditions of the Old World. They are developing all over this great country an understanding of the value of sculpture. They are ennobling and beautifying our public buildings and the parks and squares of our cities with many noble examples of genuinely American art.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 4735.

THE PRINCESS PAYS A VISIT TO THE SHIP

Faithful John led the princess, the daughter of the King of the Golden Roof, triumphantly to the ship to view the golden wares, and when the king saw her he thought his heart would leap out of his breast with joy.

THE STORY OF FAITHFUL JOHN

CONTINUED FROM 4538

AN old king who was dying summoned his best-loved servant, whom he had named Faithful John, because he had served him so well.

"Faithful John," said he, "I am about to die, and I wish you to teach my young son all he should know, and be as a father to him."

"I will serve him faithfully," was the reply, "even at the cost of my life."

"You must show him the whole palace, all the rooms and treasures; but beware how you show him the room in which hangs the picture of the daughter of the King of the Golden Roof. If he sees it he will fall deeply in love with her, and be in great danger."

After the old king's death, Faithful John said to his young master: "Come, I will show you your father's palace." Then he showed him all the treasures and all the rooms, except the one wherein hung the picture. Now, when the young king saw that Faithful John always passed the door of that room, he said:

"Why do you not open that door?"

"You would be terrified if I did," replied Faithful John.

"I must know what is in there," cried the king, and tried with all his strength to force the door open. John held him back, saying:

"I promised your father to beware how I showed you this room, lest what was within should lead both you and me into great troubles."

"My chief trouble will be not to enter the room," replied the king. "I shall not go away until you show it to me."

With a heavy heart Faithful John opened the door. There was the picture of the princess, and the king stood before it in silent admiration. Then he turned to his servant and asked:

"Whose is that beautiful picture?"

"It is the picture of the daughter of the King of the Golden Roof."

But the king said: "My love for her is so great that if all the leaves on the trees were tongues they could not utter it. I will risk my life itself to win her."

Poor Faithful John thought deeply for a long time, and at last said:

"All that the princess has about her, the tables, chairs, cups, dishes, all the things in her palace are of pure gold, and she ever seeks new treasures. Let us order the goldsmiths to work all your gold into beautiful vessels, into birds and wondrous beasts, and let us go disguised as merchants to seek her."

So they boarded a ship and sailed away to her country. Then Faithful

John bade the king await him, and, taking some of the golden vessels, he made his way to the palace.

Now, when the princess saw the wares she was delighted, and said: "They are so lovely, that I will buy them all."

But Faithful John said: "I am only the servant of a rich merchant who awaits me in yonder ship, which is full of the most precious golden vessels."

"Let him bring them all here," she replied. "I long to see them."

"They are so numerous that it would take many days," replied John, "and the palace could not contain them."

"Take me to the ship, then," urged the princess.

So Faithful John led her triumphantly to the ship; and when the king saw her he thought his heart would leap out of his breast with joy.

"Come down into the state cabin and view my treasures!" he exclaimed. But Faithful John remained on deck, and ordered the ship to be put off.

"Spread all your sails," he cried, "that she may race over the waves like a bird through the air."

Meanwhile, the king showed the princess all the dishes, cups, and birds, and wonderful beasts, each one singly, and when they returned on deck, and the princess saw that the vessel was far away from her home, she cried aloud:

"Alas! I am stolen by a roving trader; I would sooner have died."

"I am no trader," said the young king, taking her hand. "I am a king of as noble birth as you. I have taken you away by stealth because of my great love for you." And he told her the whole story, and she loved him.

Now, while they were sailing home, Faithful John heard three ravens, who had alighted on the ship to rest, talking, for he understood their language.

"There he goes sailing away home with the princess," said one.

"He has her not," said another; "for when he lands a foxy-red horse will spring towards him, and, if he mounts it, it will bear him away into the air, so that his bride will never see him more."

"True," said the third; "but if someone quickly kills the horse, the king is saved, but the slayer is turned to stone from the soles of his feet to his knees if he tells of it."

"True," said the second; "but even then the king loses his bride, for the golden bridal robe that lies on the couch in his palace is really made of brimstone and pitch and will burn him up."

"Alas! Alas! Is there no help?" cried the first raven.

"All will be well if someone throws it quickly into the fire; but if he tells the reason, he will turn to stone from his knees to his heart," replied the second.

"But I know more," added the first raven; "for in the dance after the wedding the young queen will turn pale and swoon, and she will surely die unless someone lifts her up and draws three drops of blood from her. But if he should tell, his whole body will turn to stone from the crown of his head to the tip of his toe." And the ravens flew away, leaving John very sad.

When they came to land, all happened as the ravens had foretold, and Faithful John saved his master three times. But the young king did not know why he had acted so strangely, and condemned him to death. Then Faithful John exclaimed:

"I am wrongfully judged, for I have been ever faithful and true." And he told all that the ravens had said.

"Oh, my most faithful John!" cried the king, "Pardon! Pardon! Set him free." But John had fallen down a stone statue. The king grieved bitterly, and ordered the stone figure to be taken to his room.

Some years after, when his two little sons were playing beside him, the king glanced at the statue and sighed:

"Oh, that I could bring you back to life, my Faithful John!" To his surprise, the statue answered: "You can, O king, if you will give up your children."

The king was greatly shocked; but he thought how John had died for his sake, and he said that he would.

The statue came to life at once, saying:

"Keep your children, your truth is indeed rewarded."

When he saw the queen coming in, the king hid the children and John in a closet, and tested her in the same way; and she agreed that John must be brought back to life. Rejoicing that his wife thought as he thought, the king opened the closet, and cried:

"Behold! Faithful John is indeed ours again, and we have our sons safe too." He told her the whole story, and they all lived happily together.

THE SHEPHERD MAID AND THE SWEEP

AN old-fashioned oaken-wood cabinet, quite black with age and covered with fine old carving, once stood in a parlor; it was carved from top to bottom—roses, tulips, and little stags' heads with long, branching antlers, peering forth from amid the curious scrolls and foliage surrounding them. Moreover, in the centre panel of the cabinet was carved the full-length figure of a man. He was a most ridiculous figure; he had crooked legs, small horns on his forehead, and a long beard. The children of the house called him "the crooked-legged Field-Marshal-Major-General-Corporal-Sergeant."

There he stood, his eyes always fixed upon the table under the pier-glass, for on this table stood a pretty little porcelain Shepherdess, her mantle gathered gracefully round her and fastened with a red rose; her shoes and hat were gilt, her hand held a crook—oh, she was very charming! Close by her stood a little porcelain Chimney-sweep. His face was as fresh and rosy as a girl's, which was certainly a mistake, for it ought to have been black. His ladder in his hand, there he kept his station, close by the little Shepherdess; they had been placed together from the first, and had long ago plighted their troth to each other.

Not far off stood a figure three times as large as the others; it was an old Chinese Mandarin, who could nod his head; he declared that he was grandfather to the little Shepherdess, and when the crooked-legged Field-Marshal-Major-General-Corporal-Sergeant made proposals to the little Shepherdess, he nodded his head in token of his assent.

"Now you will have a husband," said the old Mandarin. "You will be the wife of a Field-Marshal-Major-General Corporal-Sergeant, of a man who has a whole cabinet full of silver-plate, besides a store of no one knows what in the secret drawers."

"I will not go into that dismal cabinet!" declared the little Shepherdess. "I have heard that eleven porcelain ladies are already imprisoned there."

"Then you shall be the twelfth, and you will be in good company," rejoined the Mandarin. "This very night, when the old cabinet creaks, you shall have a wedding party, as sure as I am a Chinese Mandarin." Whereupon he nodded his head and fell asleep.

But the little Shepherdess wept, and turned to the beloved of her heart, the porcelain Chimney-sweep.

"I believe I must ask you," said she, "to go out with me into the wide world, for here we cannot stay."

"I will do everything you wish," replied the little Chimney-sweep. "Let us go at once. I think I can support you by my profession."

"If we could but get off the table!" sighed she. "I shall never be happy till we are away."

And he comforted her, and showed her how to set her little foot on the carved edges and delicate foliage twining around the leg of the table, till at last they reached the floor. But, turning to look at the old cabinet, they saw everything in a great commotion; the old Mandarin had awakened, and was rocking himself to and fro with rage.

"Oh, just see the old Mandarin!" cried the little Shepherdess; and down she fell on her porcelain knees in the greatest distress.

"Have you the courage to go with me into the wide world?" asked the Chimney-sweep, taking her hand.

"I have," replied she.

And the Chimney-sweep looked keenly at her, then led her to the stove.

"Oh, how black it looks!" sighed the shepherd maid. However, she went on with him, through the flues and the tunnel, where it was pitch-dark.

"Now we are in the chimney," he remarked; "and look, what a lovely star shines above us!"

And there was actually a star in the sky, shining right down upon them, as if to show them the way. They crawled and crept till they reached the top of the chimney, where they sat down to rest for a while.

Heaven with all its stars was above them, and the town with all its roofs lay beneath them; the wide, wide world surrounded them. The poor Shepherdess had never imagined all this; she put her little head on the Chimney-sweep's arm, and wept so that the gilding broke off from her waistband.

"This I cannot endure!" she exclaimed. "The world is all too large.

Oh that I were once more upon the little table under the pier-glass! I shall never be happy till I am there again. I have followed you out into the wide world, surely you will follow me home again, if you love me."

And the Chimney-sweep talked very sensibly to her, reminding her of the old Chinese Mandarin and the crooked-legged Field-Marshal-Major-General-Corporal-Sergeant; but she wept so bitterly, and kissed her little Chimney-sweep so fondly, that at last he could not but yield to her request. So with great difficulty they crawled down the chimney, and

THEY REACHED THE TOP OF THE CHIMNEY, WHERE THEY SAT DOWN TO REST

at length found themselves once more in the dark stove.

Everything was quite still. They peeped out. Alas! on the ground lay the old Chinese Mandarin; in attempting to follow the runaways, he had fallen down off the table, and had broken into three pieces.

"Oh, how shocking!" exclaimed the little Shepherdess. "Poor old grandfather is broken in pieces, and we are the cause of this dreadful accident."

"He can be put together again," replied the Chimney-sweep. "If they glue his back together, and put a strong rivet in his neck, then he will be as good as new again."

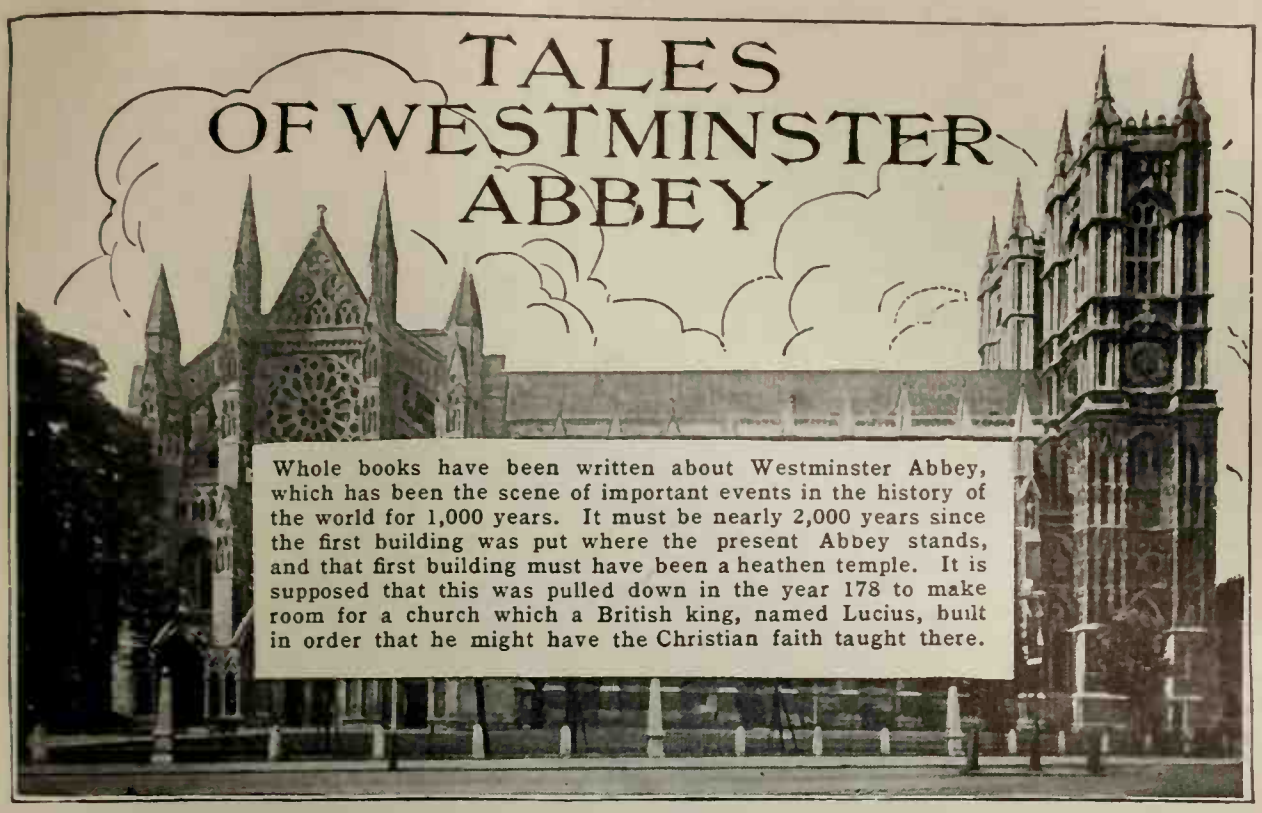
"Do you really think so?" she asked. And then they climbed up the table to their old places.

The old Chinese Mandarin was put together; the family had his back glued and his neck riveted; he was as good as new, but he could no longer nod his head.

"You have certainly grown very proud since you broke in pieces," remarked the crooked-legged Field-Marshal-Major-General-Corporal-Sergeant, "but I must say, for my part, I am unable to see that there is anything to be proud of. Am I to have her or am I not? Just answer me that!"

And the Chimney-sweep and the little Shepherdess both looked imploringly at the old Mandarin; they were so afraid lest he should nod his head. But nod he could not, and it was disagreeable to him to confess to a stranger that he had a rivet in his neck, so the young porcelain people always remained together. They blessed the grandfather's rivet, and loved each other all the remainder of their lives.

TALES OF WESTMINSTER ABBEY



Whole books have been written about Westminster Abbey, which has been the scene of important events in the history of the world for 1,000 years. It must be nearly 2,000 years since the first building was put where the present Abbey stands, and that first building must have been a heathen temple. It is supposed that this was pulled down in the year 178 to make room for a church which a British king, named Lucius, built in order that he might have the Christian faith taught there.

HOW THE MONKS BECAME VERY RICH

THE great roadways and buildings now about Westminster Abbey were not always there. The spot was once an island in the Thames. All about it were dreadful marshes, and on the island itself were great thorny thickets, so they called the island Thorney Island. In the thickets great deer and wild oxen, of which we read on pages 405 and 412, roamed at will, and the place must have been wild and terrible indeed. Here it was, then, that a band of monks settled and built themselves a monastery, and here King Sebert, the first Christian king of the East Saxons, built his church. When the church was finished, a service was ordered for its consecration.

In course of time a great monastery grew up on the little island, and when Edward the Confessor resolved to build a church, it was here that he built. St. Peter, the monks said, appeared to him in a dream, and bade him choose that site. In 1050 he started to erect the church. Earlier kings had granted the monks certain rights, and Edward made these good and gave other rights. But he never dreamed that the church which he built would become of such importance as was to be the case. What he desired to have was simply a church which would serve as a burial-place for himself, near a great monastery whose monks would be near at all times of the day and night to pray for his soul. The actual charters which the chapter had received gave them power and lands, but someone forged others. For hundreds of years rights, privileges, and wealth were enjoyed on account of documents said to have been written and signed by the Saxon kings. Nobody thought of questioning them until the eighteenth century. Then learned men carefully examined them, and found that many of these charters had been forged by someone after the Norman Conquest, probably in the time of William Rufus. They were found to be written in the Norman-French language, which was never heard in England until after the Saxon kings ceased to exist.

The dream of St. Peter and the fisherman had enough influence to cause the Abbey to be named after the apostle. The real name of Westminster Abbey is the Church of St. Peter in Westminster. The Abbey proper, where the abbot and all his monks lived, has long since disappeared, and the property which they owned—Hyde Park and Windsor, and many other great estates—has passed into other hands.

For a long time the Abbey was the centre of court and religious life in England. Kings were crowned in the

Abbey, their children were born within its walls. The abbots became men of great power, but sometimes their rulings did not please the people, and then the mob would rise and cause the abbot to flee. But it was only for a little time. Order would be restored, the ringleaders might be beheaded, and other rioters would be severely punished.

King after king enriched the Abbey, and the knights of Henry III. brought back to him from the Holy Land a vessel which they declared to contain some blood of the Saviour. Henry believed it. He had a great procession, and himself carried the vessel, raised above his head, all the way from St. Paul's Cathedral to the Abbey. He went on foot, dressed in humble raiment, and two bishops supported his arms lest he should stumble. The vessel was placed in the Abbey, and the king gave a great banquet to celebrate the occasion, and knighted several distinguished men.

The same king received a piece of marble which he believed bore the foot-print of the Saviour. This he placed with the vessel of blood, to be ever a treasured relic in the Abbey. Another king presented to the Abbey a girdle, which he believed to have been made and worn by the Virgin Mary.

Many English kings enriched Westminster Abbey with costly treasures. Henry III. was presented by some of his crusading knights with a vessel supposed to contain some blood of the Saviour, and he carried it himself in a great procession to the Abbey, raised above his head, as we see in this picture.

HORSES FOR NOTHING AT WESTMINSTER

MOST of the kings who helped to build or beautify the Abbey made the people pay heavily in taxes for it. But sometimes they could be generous in return. Some of them had strange notions of the way in which a gift should be presented. In 1274, when Edward I. went to the Abbey to be crowned, great crowds of people assembled about the Abbey to see him and his nobles arrive. Five hundred horsemen rode up. They were the royal princes and the great men of the land. Each rode upon a splendid great horse with magnificent trappings. It was a very great occasion, for Eleanor, the king's wife, was with him, and this was the first time that a king and queen had ever been crowned together in the Abbey. So everybody was in generous mood. Therefore, the princes and nobles who had ridden up on the five hundred great horses, after dismounting, turned all the horses loose among the crowd. Fancy such a thing

TURNING LOOSE FIVE HUNDRED HORSES

When Edward I. and his wife were crowned, five hundred princes and nobles, after dismounting, turned their magnificent chargers loose among the crowd, for anyone to catch and to keep for himself.

happening to-day! Picture five hundred battle-horses charging wildly through the crowded streets, knocking down and trampling upon the children, the weak, and the aged! This is what happened on the coronation day of Edward I., and those who caught the horses were allowed to keep them.

THE QUEEN WHO HID BY NIGHT

IN the rough-and-ready days, kings and the people were often very lawless. Men's lives were taken without trial. To be suspected or accused of having done something or merely to be the victim of another person's wickedness, was enough to cause a man to be murdered. So the church offered protection in a special part of the building, called the sanctuary. Once arrived there, a person in danger was safe. It was a crime to refuse to allow him to enter; it was a still greater crime to arrest him while there. This protection was afforded by the law of the land until the time of James I., and although it was then abolished, sanctuary still continued to exist until the time of William III. No sanctuary was more famous than that of Westminster Abbey. Many a man's life was saved by his being able to secure shelter there until time had been given for him to prepare his defence, or the wrath of his enemies to cool down, and for him to show that he was innocent. But even so sacred a place as the sanctuary of the Abbey could not always prevent men from doing ill. Once murder was done in the sanctuary. John of Gaunt persuaded his young kinsman, Richard II., to imprison two squires in the Tower. The young men escaped and took refuge in Westminster Abbey. John of Gaunt was furious at this, and he determined to have them out of the sanctuary. He was a man; the king, his nephew, was only a boy of twelve, so John sent men to arrest the two squires in the Abbey.

Fifty armed men went into the church while Mass was being said. They seized one of the squires and took him away to the Tower. The other drew his sword, and defended himself. Not until he had received twelve dreadful wounds did he yield. Then he fell dead before the eyes of the horrified monks, at the steps of the altar. This caused a great outcry in the country. Parliament refused to do its work near the scene of the shameful crime, and the Abbey was shut up for four months. The knights who led the murderers were punished, and had publicly to do penance in the Abbey for their great sin. It was from the sanctuary of Westminster that Richard the younger of the two little princes who were murdered, went to the terrible Tower. He was the son of Edward IV. At the death of the latter, Elizabeth, his queen, felt greatly afraid of the wicked Duke of Gloucester, who afterwards became Richard III. He was the uncle of the little princes, and the loving mother knew that if he could get the two boys out of the way, he would be able to have himself made King of England. Now, Edward, the elder boy, at the

The queen of Edward IV., after the death of her husband, fled for sanctuary to Westminster Abbey, with her children, at dead of night, in fear of Richard, Duke of Gloucester. Here we see her just after she arrived at the Abbey.

death of his father, became King Edward V. He was born in the sanctuary of Westminster, but was, at the death of his father, staying at Ludlow. The poor boy was only thirteen, but it was necessary for him to go to London to be crowned, and Lord Rivers set forth with him. But when the young king had reached Northampton, the wicked Duke of Gloucester, who desired the crown, had him seized.

Elizabeth, the widowed queen, determined that her other children should be saved. So she went at dead of night with her five daughters and little Prince Richard to Westminster Abbey, and took shelter in the sanctuary. And there she seated herself on the rushes with which the floor was covered, all desolate and dismayed at what the wicked duke might do. There, great men came to her and promised her support, and swore that her son should be king. The date of the boy Edward's coronation was fixed. The dresses of the guests were made, the banquet was prepared; but the dresses were never to be worn for that occasion, nor the banquet eaten. The duke had got possession of Edward; he now meant to have Richard, who remained still with his mother in the sanctuary. When they came to tell her that the duke insisted on her giving up her second son, the queen made a brave speech denouncing the act, and at first defied her enemies. But what could one poor woman do against an army? She had to yield. She took the little boy in her arms and fondly kissed him, saying, "God knoweth when we shall kiss together again." Then she was parted from him.

The two little princes were sent to the Tower, and the Duke of Gloucester became King Richard III. By his orders the princes were murdered. No one was allowed to speak of them while Richard lived. Long afterwards, the bones of the two poor children were found buried under a staircase in the Tower. The remains were removed to Westminster Abbey, and there they remain to this day, to remind us of the horrible crimes which have been committed in the days that are past in order to gain the crown of England.

WHEN THE TREASURE WAS STOLEN

WE have told you that forgery was committed at Westminster. Edward II. had to learn that burglars could work there also. When he traveled from his palace in London, it was his habit to leave his gold and silver and other treasures in the Abbey. He discovered, in about 1300, that some of his treasure had been stolen, but, in order not to bring disgrace upon the Abbey, he consented to let the matter be kept secret. When he went forth to war with Scotland, he left in the Abbey treasure worth $500,000, which in our time would be worth a great deal more.

While he was in Scotland, travelers from England brought him strange stories of royal treasures being sold in London, and of gold and silver plate being found about the Abbey. He caused inquiries to be made, and found that nearly all his treasure had been stolen.

The man upon whom chief blame was fastened was a pedler, but some others also were guilty. This pedler had been able to make an underground tunnel beneath some of the rooms next to the treasure room. He had taken away and sold much of the treasure; but his helpers took still more. They had a little cemetery near the Abbey, and in this they buried the stolen goods, and, in order to make it secure, they covered the ground by sowing hemp. People had seen them going out with hampers heavy with gold and silver plate. Fifty of the guilty were sent to the Tower, and the chief officials were tried.

The Crown jewels were gradually brought together again, but it was long believed that many of them remained hidden in the Abbey, and more than three hundred years afterwards a party of men set out at midnight to find the treasure.

They carried lighted candles in their hands, and had rods which they were foolish enough to think would guide them to the treasure. When they came to what they thought seemed a likely spot, they dug down six feet deep till they came to a chest, but it was only a coffin. They tried and tried elsewhere, but nothing rewarded them. A great storm arose, and the searchers thought that it was caused by demons, so they hurriedly left. If they had not done so, they said, the demons would have blown down the west side of the Abbey.

THE DUCHESS WHO SAT IN RAGS

IN the reign of Queen Anne, one of the greatest ladies at the court was the Duchess of Marlborough. Soldiers and statesmen were glad to gain her friendship because of her influence with the queen. Indeed, the duchess was for a time the uncrowned queen, for Queen Anne was for a long period very much guided by what the duchess said. What a surprise it must have been, then, for a gentleman who wrote that, when a boy on his way to school, he saw the great duchess sitting in rags and ashes in the Abbey among filthy beggars. Her son was dead, and the duchess had gone to the Abbey in sackcloth and ashes to weep for him. Around her were the beggars and gamblers and swearing loafers who at that time made the Abbey a scandal to the nation.

The great Duchess of Marlborough, whose husband won the battle of Blenheim and other great victories, clothed herself in rags in grief for the death of her son, and went to the Abbey to mourn him.

A KING'S REVENGE ON CROMWELL

PERHAPS the most shameful digging that was done in the Abbey happened when the bodies of Oliver Cromwell, his mother, his sister, his granddaughter, and some of his generals were dragged from their graves. They had all been buried in the Abbey. When Charles II. was permitted to return to England and was crowned, he vented his vengeance on the dead.

It is a vile thing to heap disgrace upon the dead, but the King of England did not think it too mean or wicked a thing. The bodies were dug up from their graves in the Abbey. Cromwell's body and those of Ireton and Bradshaw were dragged on sledges to Tyburn, where criminals then used to be hanged. The corpses were hanged upon the gibbet all day. Then they were taken down, and, after the heads had been cut off, they were thrown into a pit at the foot of the gallows. The heads were stuck on spears and nailed up on the top of Temple Bar, a ghastly sight for all to see.

DIGGING UP THE BODY OF CROMWELL

When Charles II. came to the throne of England, he ordered the grave of Oliver Cromwell to be opened, and his dead body to be removed from the Abbey and treated as though the Great Protector had been one of the worst of criminals. This picture shows the men carrying out the king's orders.

Charles II. was one of the worst kings who ever sat on the throne of England, and he cared nothing for the honor or the welfare of the kingdom; but he did nothing which made his name so infamous as this cruel and cowardly thing.

THE QUEEN WHO WAS TURNED AWAY

A DUCHESS could sit in rags in the Abbey, but the day came when a Queen of England was not permitted to enter in coronation robes. That queen was Caroline, the wife of King George IV. He was a selfish and mean-spirited man, and he had forced her to live alone in London while he was only the Prince of Wales. When he became king he wished to get rid of her. He offered her a great sum of money to abandon the right to call herself queen, but this she refused to do. Then he tried to prove that she was a wicked woman, and not fit to be his wife. This plan also failed. On July 19, 1821, he went alone to Westminster Abbey to be crowned. The queen had been abroad, but she had made haste to return so that she might claim her right to be crowned in the Abbey with him. The king cruelly gave orders that she was not to be admitted into the Abbey. She went early in the morning to the Abbey and demanded, as Queen of England, to be admitted. Soldiers had orders to keep her out. She went to a second door of the Abbey, but was again prevented from entering. The same thing happened when she went to a third door. Then she went home, broken-hearted, and about three weeks afterwards she died.

George IV. was a cruel husband, and refused to allow his wife Caroline to be crowned with him. She dressed herself in her coronation robes and tried to get into the Abbey, but by order of the king was not allowed to enter. Here we see the officials refusing to admit her into the Abbey.

THE BOY WHO SLEPT IN THE KING'S CHAIR

NOT all the stories of Westminster Abbey are so sad as some of these which we have been reading. Laughable things have sometimes happened. There was once a schoolboy who hid himself in the Abbey so that he should be locked in at night. All came about as he wished, and he *was* locked in. Now, there is in the Abbey, as we all know, the Coronation Chair, the great chair which is used only when the sovereign is crowned. All manner of curious stories are told about this chair, for there is underneath its seat the famous "Lia Fail," the stone on which the kings of Scotland were crowned. Tradition says that the stone was used in Israel.

But the schoolboy was not afraid to make himself comfortable in it. In the wonderful Coronation Chair he passed the night as snugly as in the little bed which he should have been filling. And when they opened the Abbey in the morning, they found that the young rascal had used his knife to carve upon the Coronation Chair this daring message for all the world to read: "I, Peter Abbott, slept in this chair."

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WHAT MAKES A FAIRY RING?

CONTINUED FROM 4588

FAIRY rings are made of a kind of fungus. Now, it is the great mark of all kinds of fungus—including those which we can eat, and which we call mushrooms—that they contain no green matter, such as we find in grass or in the leaves of trees. It is by means of this green matter that green plants live upon the air. Those which are without it have to feed like animals, not upon the air, but upon solid or liquid things.

Animals can move to the food they want; but plants, even fungi—as we say for "funguses"—cannot. Let us suppose that these fungi start at some place in the ground, and that the old ones as they die bud off new ones all around them. The place where they started will soon have all the food taken out of it, but outside that place there will be some more food. So the new fungi can grow on the outside, but not on the inside. On the inside of the growing line the food material is constantly being used up, and so the fungi gradually die, leaving nothing behind them.

This means that a ring will be formed, and as time goes on this ring will grow bigger and bigger as the new fungi spread out in search of new soil that still contains the food upon which they can live. This is a very different explanation from what is suggested in the name fairy rings, but it has the great advantage of being perfectly true. The picture at the top of this page shows how these fairy rings grow in a field. There are numerous legends told in various parts of the world about these wonderful rings, and so, perhaps, there is some excuse for those superstitious country folk looking upon them as a kind of magic circle.

WHY DOES DAMP AIR OFTEN MAKE US ILL?

Damp air is often cold air, and the cold has usually been blamed for making us ill, though many facts prove that it is not blameworthy at all. There is one great difference between damp air and dry air, which accounts for the fact that people usually feel at their best in dry air, while many feel at their worst in damp air.

Water is always leaving our bodies by many channels, such as the skin and the breath. When the air is dry, this journey of water is readily made, but when the air is damp, it already contains a quantity of water, and so does not easily take up more, and the passage of water from our bodies is, to a certain extent, checked.

All life, as we know, is lived in

water, and if life is to go on, enough fresh water must always be supplied to the living body, no matter whether it be a man or an animal or a plant. When the passage of water is slowed, as it is in damp air, then the processes of our lives are checked, and our bodies are likely to become choked up with things which would otherwise have been burned up and got rid of. This seems to be the real key to the effect of damp air upon rheumatism.

WHY DOES A DOG GO ROUND AND ROUND BEFORE IT LIES DOWN?

The answer to this question lies in the answer to another: What is the dog? We are so familiar with animals like dogs and cats, and horses, and pigeons, that we often forget their history. Really, the dog is not a natural animal. All natural animals are wild; but these are tame—domesticated, as we say, which simply means made tame.

Now, these domestic animals very often follow the habits of their wild forefathers, though hundreds of generations may have passed since those forefathers were wild. This is a very wonderful fact, showing how things are handed on from parents to children, very largely without reference to what the outside circumstances may be.

The dog, as it turns round and round before it lies down, gives us an instance of one of these inherited habits.

As the habit is really inherited, and is natural in the dog, and has not been taught it, by itself or anyone else, we call it an instinct. If it were a thing learned by the dog, like a trick, it would not be an instinct. The dog's far-away ancestors were animals that lived in the jungle-grass, and if they wanted a comfortable bed they had to turn round and round a few times so as to level the grass.

This leads to a further question, too difficult for us to answer until we have learned more than we yet know. We might ask: How did this habit first begin? For it must have had a beginning; but how it began we cannot yet say, though we are fully aware of what happens when it has begun.

CAN OUR BRAINS EVER BE FILLED UP?

Only a few years ago it would have been said that after a certain age people's brains completely stop growing. That, however, is not quite true, because it has lately been found that in almost all of the brains, at any rate of the higher types of people, there are a certain number of cells which have not fully developed so as to do any work, and which it is believed may grow and develop even after a person is fully grown up, if he sets about the matter in the right way. However, most people use their brains just as little as they can after they leave school, and so they do not give themselves much chance of making their brains grow.

Apart from this, it is true that in some way and to some extent, varying very much in different people, the brain may become, so to speak, full up, so far as the mere memory of things is concerned. It is as if the newer traces, when they are much repeated, wipe out the marks of the older ones, or press them so deep that we cannot get at them.

All this, however, is a great mystery; and it is quite certain that in the case of many people there is no real limit to what the brain can do and hold. The poet Browning made his great scholar say, "No end to learning"; and this is a motto in which the wisest men have always believed. It is also certainly a motto which keeps people young, young at any age, and helps to prolong their lives.

IS A CLEVER MAN'S BRAIN LARGER THAN A STUPID MAN'S?

This is not so easy a question to answer as we might suppose. It is certainly true that the higher and cleverer races of mankind have larger brains, on the average, than the lower races. But if we go more into detail than this, we soon meet with difficulties. Among people of the same race, a very clever man may have a brain which is really smaller and lighter than that of an ordinary, or even a stupid, man. This has long been a great puzzle, but it can be explained.

To weigh and measure the whole brain is a mistake, and it really cannot prove very much. It is not the whole of the brain, so to speak, that counts. For instance, there are open spaces inside all brains, and in different people these differ in size and in the weight of what they contain. Also, the amount of what may be called packing in the brain seems to vary in different people.

The things that really count are the nerve-cells found in the grey layer on the

surface of the brain. Where the brain is folded, this grey matter dips into folds, and a small, much-folded brain may really have far more grey matter than a big, rather smooth brain; also the grey matter varies in thickness in different people, and in different parts of the same brain.

If it were possible to make the test by the real thing which counts, we should not have much difficulty in finding the connection between the size of the brain and the mind. In order to do this, however, we should really have to count the number of nerve-cells in each brain. Perhaps even then we might not be wholly at the end of the question, because it is very likely that one cell is not as good as another.

WHY DOES A TUNING-FORK SOUND LOUDER WHEN IT TOUCHES WOOD?

The fact that the sound is louder must mean that more power, in the shape of sound-waves, is reaching our ears; so first we have to ask ourselves whether the thing upon which the tuning-fork rests is making the additional sound, and the answer is: Certainly not. We have to explain what happens, without for a moment suggesting that any new sound is being made anywhere, even though more sound does certainly reach our ears.

We are right when we say that the thing on which the tuning-fork rests resounds, meaning that it throws the sound which reaches it back towards our ears. The proper name for it, because it resounds, is a *resonator*.

The sound from a tuning-fork, like the light from a candle, flows out in all directions. We, of course, only hear what comes in one direction, and that is really only a very small part of the whole. The resonator increases the amount of sound that reaches our ears, but it makes nothing; and just as much as it increases the sound in our direction, so it diminishes the sound in the direction beyond the resonator.

WHY ARE SOME THINGS POISONOUS?

We could only answer this question completely and fully if we knew all there is to know about life. Plainly, unless we understand life, we cannot understand entirely why certain things cause death. But we know enough about certain great facts of life to explain why a great many poisons are poisonous. And it is deeply interesting to learn that many things which poison us also poison every kind of animal and every kind of plant—a man, a worm, an oak, a microbe. The living stuff which makes the living part of all these and all other living creatures is called *protoplasm*, and the poisons which destroy all forms of life are called "protoplasmic" poisons. Their deadly dose varies, and some of them are valuable as medicines in small doses; but there is no question as to their real nature, and it can be explained. The best-known protoplasmic poisons are prussic acid, arsenic, phosphorus, alcohol, and chloroform.

The first and most urgent need of all life is to breathe, and so we might expect these poisons to act by interfering with breathing—not so much with merely getting air into the lungs, but with the real breathing, or burning, which goes on in a muscle, a leaf, a microbe, or any other living creature. And we find that, in their various ways and degrees, the protoplasmic poisons interfere with the *oxidation*, or the burning or breathing, of the living cells.

Prussic acid, alcohol, and chloroform stop the working of the breathing-centre in the brain, and they also prevent oxygen getting loose from the red cells in the blood. They fasten it to these cells, so to speak, so that the cells that really want it are suffocated and die.

WHY ARE SHADOWS LONGER AT THE END OF THE DAY THAN AT THE BEGINNING?

This is not true, for our shadows are equally long at the beginning and at the end of the day. When the question was asked, surely the questioner was calling the beginning of the day the time when most of us begin the day by getting up. But, of course, the day begins when the sun rises, though that may be hours before we rise.

The length of a shadow depends on the height of the sun above the horizon. We can easily prove for ourselves that this must be so if we hold a light in our hand and raise it up and down, and notice how that affects the length of the shadow thrown by a pencil standing on end or by any other small object.

When the sun is low, either at the *real* beginning or at the end of the day, our shadows are longer; and if ever we had the sun right overhead, as we never do in this part of the world, our

shadow would lie about our feet. We can easily see all this for ourselves with a candle and a pencil. Thus it is in some measure possible to tell the time by the length as well as by the direction of the shadows.

WHY CAN WE HEAR BETTER WHEN WE SHUT OUR EYES?

This question is partly true and partly not true, according to what we mean by hearing, or, rather, according to what it is that we are listening to. If we are listening to music, which requires our attention, and our enjoyment of which depends upon our putting together in our minds what we have just heard with what we are actually hearing at the moment, and also with what we expect to hear a little later, then the fewer things our brain is doing at the time, the better; and we certainly enjoy the music more with our eyes closed, or with them just fixed vacantly upon nothing.

The only exception to this is when we are listening to music and at the same time reading the score. In such a case the shapes of the phrases, and so on, as they are seen by the eye on a page, help the ear to understand and enjoy the shapes of them as they are heard.

But it is very different when we are, for instance, listening to a tiresome lecture in a stuffy room on a sleepy afternoon. Instead of hearing better when we close our eyes, we shall soon find that we are not hearing at all! The brain must be more or less awake in order to hear, and where it might otherwise sleep, light pouring into the eyes will help to keep it awake. If we make experiments with bright lights and sharp sounds, we find that either of them helps us to feel the other more intensely if they are going on at the same time.

CAN AN ANIMAL THINK?

There is no doubt that an animal can feel, and that it can remember. Very often we call feeling and remembering *thinking*. Indeed, there are few words used with wider or looser meaning than just this word think. But it is specially important in this case to use the word with a precise, fixed meaning. We know that a dog can feel happy or unhappy, and that it can remember and recognize its master; but what we specially want to know is: Can a dog or any other animal *reason*? Now, reasoning, or thinking, in this proper sense of the word, is really always a case of "putting two and two together." The proper name for this is the *association of ideas*—that is, the putting together of ideas. When we begin to connect things in our minds we begin to think, and then we say that one thing makes us think of another. The best thinkers are those in whom this association of ideas is widest and richest and most varied, and who depend on deep connections, and not shallow, trifling ones, in the things thought about.

If now, as the writer believes, we study the behavior of dogs or elephants or birds, or many other kinds of animals, we find abundant proof that they do associate ideas, "put two and two together," and often act accordingly on the conclusions thus reached, just as we do. But the thinking of the cleverest animal is always about simple things, and deals only with the simplest questions. A child of two years old is a far better and deeper thinker than the cleverest animal that was ever born.

DO ANIMALS FEEL PAIN AS WE DO?

This is not a question that can be answered directly; indeed, when we come to think of it, we shall see that no one of us can really compare the amount of pain he feels with what anyone else feels. We cannot feel anyone else's pain, and so we can only judge questions like this indirectly.

Yet it is certain that animals feel pain far less than human beings do. Different kinds of human beings feel pain differently. Small babies and children are probably much less hurt than grown-up people are by the same thing, though we may be misled by the fact that grown-up people usually control better the results of pain.

Probably women are slightly less sensitive to pain than men. It is well known that, on the average, they can drink fluids hotter, or hold hotter plates, without pain, than men can. The lower races of mankind differ immensely from ourselves in this respect. For instance, an African negro will often cut and mutilate his body, and take very little or no notice of it.

So we find that animals feel pain far less than we do. The stroke of a whip, which would hurt us terribly for hours and leave a mark for days, must certainly

feel very different to a horse: and we know that a horse will contentedly eat his food and never move his head in the slightest while a vein or artery is being opened in his body.

DO BIRDS ALWAYS SING THE SAME SONG?

We do not yet know as much as we should about the songs of birds, and this is a pity, because what we do know is very interesting. In the first place, we are sure that various kinds of birds have various songs of their own, more or less as the various kinds of animals make sounds of their own.

But the more we study other kinds of living creatures, the more we find that individuals differ much as we do. We think that all Chinamen and all negroes look the same. They think that we all look the same. We think that the sheep of a flock all look the same; the shepherd knows that they differ just as we do. And birds of the same kind vary to a certain extent.

It has been noticed that certain kinds of birds change their song as the year advances. The tune is not quite the same in early spring as it is in summer. Sometimes the difference is definite, and can be expressed in terms of music.

Various interesting results are observed when a bird of one kind tries to teach its song to birds of another kind, as sometimes happens. But we do not yet know much about this. It is very remarkable, however, that young cuckoos, though they are hatched in the nests of birds of other kinds, keep their own particular kind of song.

WHY DO WE NOT GROWL LIKE ANIMALS WHEN WE ARE HUNGRY?

It is quite certain that human beings and animals feel very much the same when they are hungry. "A hungry man is an angry man." The rule is that, among ourselves and animals, anger is apt to be aroused whenever there is any interference with the most important things on which life depends. Thus, a man very soon begins to grow angry if he is choked, and especially if the smell and sight of food are not quickly followed by the taste of it.

Many years ago the great Darwin showed how animals and men express their feelings very often in much the same way. But man has the power of speech, and this makes a great difference. So, instead of actually growling when he is hungry and angry, he speaks, often showing his bad temper by the words he chooses and his tone of voice. Perhaps someone will then say to him, "Well, don't growl about it," showing that his words just mean a growl, and are really the same thing. If speech is impossible, then even human beings may growl when they are hungry, as some people do who have lost their minds, or as babies cry when they are hungry. Indeed, that is the reason why babies are born with the power of crying from the first.

Many animals, when interrupted at a meal, get very angry and growl; and many human beings, especially men, behave in much the same way if they are interrupted during a meal. But we ought to learn not even to feel anger, much less show it; and then we prove ourselves human, and not animals.

WHY DOES A SHADE MOVE TO AND FRO WHEN HUNG OVER THE GAS?

If we could closely watch the air above a lighted gas-jet, we should see that it is continually in rapid motion. Indeed, so powerful is this motion that in some cases a room is better ventilated and has purer air when illuminated by gas, which keeps the air moving, though it uses the air up, than when it is lighted by electricity. Of course, the moving air strikes anything near it, such as a shade, and if the shade is light it will move.

The gases produced by the burning of gas are principally carbon dioxide and water in the form of a gas—water-vapor, as it is usually called. These gases, made by burning, are naturally very hot, and so they rise quickly through the colder air in which they find themselves, because that air, being cooler, is heavier. More than this, water-vapor is itself much lighter than air even when it is no hotter, and so that is another reason why the gases from a burning gas-jet rise quickly and disturb anything that is in their way such as the shade hung over a gas-jet.

It would be quite possible to make these hot gases do work if we balanced some sort of a wheel in their way, just as we place a mill-wheel in the way of a stream of water, and so make that do work. But the particles of gas are much lighter than those of water, and as power depends on speed and weight, there is not really a very large amount of power in their motion.

WHY HAVE LEAVES DIFFERENT SHAPES?

The great idea which we learn to apply to every fact about living creatures is that these facts usually have uses. In this way we can explain the existence of leaves; we can explain why they are flat and thin, so that the light can pierce through the whole of them; we can explain also why they move so as to catch as much light as possible.

But in this, and in many other cases, there are certain facts which we cannot explain in terms of use. We can partly explain the shapes of some birds' eggs in terms of use. But, on the whole, as regards the shapes of leaves and the shapes of eggs, we can only give the very poor explanation that they are what they are because it is their nature to be so.

There is such a thing as chance in the world—chance has its laws, as everything has laws. This applies in many ways in the not-living world; it also applies in the living world. Every living thing is made up of a vast number of different parts, and these may arrange themselves in different ways, just as the colored pieces in a kaleidoscope may arrange themselves in different patterns. The shapes of leaves, and of the ornaments on the surface of many kinds of living creatures, can only be explained in this way.

WHY CANNOT WE BREAK AN EGG IF WE HOLD IT LENGTHWAYS?

It is not exactly true that we cannot break an egg held lengthways, but certainly it is much more difficult to break the shell when we press upon it at the ends. The answer depends upon the shape of the shell. It might partly be that the shell is made thicker at the ends, or it might be that the shell is made of threads or fibres running in a particular direction; but that is not the explanation here.

We may think of the egg-shell as made up of arches. Now, when an arch is narrow and high, it is much stronger, other things being the same, than if it is very wide.

The more upright and narrow an arch is, the more directly does the mass of it resist any pressure from above. In fact, if an arch is narrow enough, it is almost the same as a straight pillar, or column, which directly resists the weight of anything upon it. On the other hand, if the legs of an arch are wide apart, they cannot possibly resist so well, but will be apt to be forced away from each other more easily, and then the arch will break.

Now, we may look upon the egg, when we press it from side to side, as made of two wide, and therefore weak, arches. When we press, we are pressing only against the thickness of the shell, and that resists us little. But when we press the ends, we are met by narrower arches, and we are pressing not so much against the mere thickness of the shell from outside to inside as against the length of it from end to end of the egg.

WHY ARE THERE NO EARTHQUAKES IN ENGLAND?

This is not an easy question to answer, because we are not yet very certain about what lawyers call the previous question—that is, What causes earthquakes? But, at any rate, we find certain features about the build of those countries where earthquakes are commonest, such as the presence of volcanoes or of soil that is due to volcanic origin.

For instance, everyone has heard of the Messina earthquake, and knows that it occurred not far from Mount Etna, one of the most famous of volcanoes. Now, in England this feature of the build of the earth's crust is absent, and that goes some way to account for the fact that they do not have big earthquakes there.

It is probably doubtful, indeed, whether even little earthquakes are started in England. It is true that earth-tremors—that is, earth-tremblings—may sometimes be felt in England, and are duly registered by delicate instruments made for the purpose; but these have not started under English soil. The disturbance occurred elsewhere, and started a wave in the earth's crust which reached there, perhaps from the other side of the globe.

WHY DO THE LEAVES OF THE ASPEN-TREE ALWAYS SHAKE?

It is true, as we should expect, that small leaves move more readily and more often than large ones. That is what we notice if we compare the leaves of a horse-chestnut with those of an aspen or a birch. But even among small leaves, some move more readily than

others; and if we take the leaves of an aspen in particular, we shall see something about them which must help them to move as they do. It is that the little stem which carries the leaf is very much flattened from side to side, and so side-to-side movements of the leaf, which mean bending the stem from side to side, are easy.

The more we study living creatures, the more do we find use and meaning in the things they do and in the way they are made. When we are in a hot and stuffy room, we sometimes use a fan to help move the air; and, indeed, we know that even a little gentle fanning makes a very great difference while it is going on.

Now, a plant requires fresh air just as much as we do; indeed, in some ways the plant's need is greater, because not only does the plant require air to breathe, but also because the air contains part of the necessary food of all green plants.

We cannot doubt, then, that the shaking of the leaves of trees has the same effect as if the trees were fanning themselves; it moves the old air away, and brings a fresh supply to the surface of the leaves, which benefits the tree.

WHY DOES OIL MAKE A WHEEL GO ROUND MORE EASILY?

It all depends upon where the oil is put. If it be on the ground, then, though the wheel will go round when it is driven, it will not "bite," and we find that the motor-car, for instance, does not move. But there is a very useful and, indeed, all-important place where oil does make the wheel go round more easily, and also makes it last far longer. That place is the axle, where the wheel turns upon the cross-piece which goes through its centre.

Here there is rubbing, or friction, for the wheel turns, and the thing which supports it is still. The friction means that there is wear and tear and the making of heat. These things have to come from somewhere, and they come from the power of the motion of the wheel. This means that the wheel has to move more slowly, for it has lost part of its power of motion.

When we use oil we get a very smooth layer between the wheel and the axle, and that lessens the friction, and so saves the power in the wheel. Nowadays it has been found that if tiny little steel balls are used, and kept properly oiled, they save still more friction, and these ball-bearings, as they are called, are now used in all sorts of machines where it is important for wheels to run smoothly and wear long and well.

If we think of oil as made of a vast number of smooth balls, far too small to see, we shall understand that oil itself makes a kind of ball-bearing.

WHY DO WE NOT SEE THE STARS EVERY NIGHT?

The stars are shining all the time, sending light to the earth, but more than this is needed for us to see. The light they send must be able to reach our eyes, and reach them distinctly enough. By day the distinctness fails, because the sun is so bright. It has long been believed that, even in the daytime, we can see the stars if we look up at them from the bottom of a deep well. But really this is not true. People believed it without trying for themselves; and when we try we find it is not true. It is true that we can see the stars in the daytime during a total eclipse of the sun.

At night the stars are often hid for other reasons. Clouds will hide them as effectually as if we close our eyelids or draw down our shades. It is curious to think that rays of light may travel through many millions of miles towards our eyes, and never reach them because of some little obstacle in the last small stage of their journey—a cloud, a shade, an eyelid, or even some opaque thing inside the eye itself.

Fog or mist, like clouds, hides the stars also; but it is well for us to remember that, day or night, whether the sky is clear or obscured by fog or mist or the heaviest clouds, whether our eyes are open or shut, the stars are still shining all the time.

IS AN ATOM ALIVE?

Not very many years ago all but a very few wise people would have thought this an absurd question. An atom was thought to be something like a grain of sand, only far smaller, and as incapable of moving or doing anything for itself as a grain of sand appears to be. But now we have begun to make the great discovery of the building of atoms, the

discovery of "atomic architecture." And we learn that really an atom is less like a building than it is like a living creature.

It is almost a living thing "writ small." The points in which atoms are like living things are many and important, so much so that now we regularly speak of the birth and life and death of atoms, because there are simply no other words so suitable to express exactly what happens.

An atom is made of many different parts, beautifully connected together, and these are not merely jointed or cemented, like the parts of a building, but are in ceaseless motion and change, like the parts of a living body. We have found that smaller atoms are born by being separated from larger ones, just as new yeast-cells are born by budding from larger ones.

It is found, too, that atoms of different kinds last for different lengths of time; their length of life varies just as when we compare an elephant and a mouse, a dog and a butterfly. And, also, atoms "die," after they have used up too much of the power with which they were born, and their bodies go to furnish the material for fresh atoms, as in the case of living beings. We are learning, too, that atoms change according to their surroundings, as if they tried to adapt themselves, as living creatures do. All of this is quite different from the old idea that an atom was absolutely fixed and unchangeable.

CAN COUNTRY PEOPLE SEE BETTER THAN TOWN PEOPLE?

When we apply it to such a very complicated thing as vision, the word greater is rather vague, and may have various meanings. People may differ in their power of seeing things at any distance they choose in a bad light, or they may differ in their power of making out the details of things at a distance, or they may differ in the power of continuously doing the same work with their eyes without growing tired. All these differences exist in various people quite apart from any question as to the need for glasses.

If we took a hundred people, and let those that need glasses wear the most perfectly made glasses possible, we should find that all those people differed in all these respects. For instance, a man may be very much inferior to his neighbors in making out separately two stars that are very close together and almost look like one. Astronomers know very well how they differ from each other in respect of this kind of keenness. But the man who is worst at this may be able to read print on a dark night when the people who can see at long distances cannot read it at all.

These differences are not yet explained; but probably, on the whole, if country folk use their eyes chiefly to see at distances, their vision will be keenest at distances, and in the case of town people it will be the other way about. As to tiredness, the rule is generally that the eyes last longest at the work to which they are most accustomed.

WHY DOES A LUMP RISE IN MY THROAT WHEN I CRY?

The throat is a very wonderful and delicate place, with certain ways of its own that have to be carefully studied. Doubtless the reason why it is so delicate and can do such curious things is that it is, in human beings, the place of speech, which is the most marvelous of all things. So, often when people's minds and brains are not quite in order, especially in the case of youngish people, we find that they have difficulty in speaking and swallowing, and especially that they think they feel a sort of ball, or globe, rising up in the throat.

This has been known for many centuries, and this globe—only it is really not there at all—has a long Latin name. Now, when we cry we are rather in the same upset state that hysterical people are in; and, indeed, in both cases the great fact is that the person has lost his or her self-control, and the brain is not rightly looking after the doings of the body.

The special explanation of the globe feeling probably lies in the fact that the throat is really a wide tube made with walls of muscle. When we swallow, a sort of wave runs along this tube from above downwards.

When we are upset, as when we cry, the machinery gets out of order, so to speak, and probably the tube starts moving when it should not, and as it should not—from below and upwards. This makes us feel as though a ball, or globe, were rising up in the throat.

THE NEXT QUESTIONS ARE ON PAGE 4811.

WHAT THIS STORY TELLS US

A CABLE which is to run under the ocean must be much stronger than a telegraph wire which is strung upon poles. The weight of the cable with its layers of wire, and the substances put around to keep the water out, is very great. The cable lies on the ocean floor sometimes as much as four miles from the surface of the water. Though many messages are now sent by wireless, the cables are still busy, for they can be used at all times, while the conditions of the atmosphere sometimes prevent the sending of wireless messages. Then, too, a wireless message may be picked up by other instruments while a cable message is known only in the sending and receiving offices. This secrecy is sometimes very important in business, and also in the affairs of government. Great damage might be done if another party got possession of the information intended for one person or one country alone. Cables therefore are not likely to go out of use.

THE WIRE THAT RUNS UNDER THE SEA

CONTINUED FROM 4598

ALTHOUGH the first wire under the sea was only laid about seventy years ago, there are to-day over 300,000 miles. These lines bring East to West and North to South in a way that our ancestors would have called magical. In one day 20,000 messages can be sent through a cable, at the rate of fifty to one hundred words a minute. Every mile of cable costs about a thousand dollars, and lasts from thirty to forty years.

The first real cable ever laid was the work of two men, Jacob and John Brett, who in 1849 obtained permission from the English and French governments to lay a cable across the Straits of Dover. The cable was made of copper wire covered with gutta percha, and it was unwound from a huge reel aboard a small tug-boat. But, after the first evening, it would not work. Undismayed, these enterprising men laid a stronger cable from Dover to Calais, and through this, messages were sent under the water. Two years more and a cable connected England and Ireland, and soon a number of lines followed. Many lines failed because they broke, or else lay in coils on the bottom through being paid out too slackly.

In 1857 the attempt to lay a cable 3,000 miles long across the Atlantic was made. Many people had laughed at the plan, but a few far-sighted men had taken it up, and the United States government and the English government each lent ships, first to make a survey of the route, and then to lay the cable. After two bad breaks, the first attempt failed. The next year a second expedition after three attempts succeeded in laying the entire line. On August 5, 1858, the President of the United States exchanged greetings with Queen Victoria of England.

There are eighteen cables across the North Atlantic now, and several different ones to the Far East. Of these, the All British Cable to Australasia and the American-Pacific Cable to Japan both run into the depths of four miles, while one of the sections of the Pacific Cable is 3,458 nautical miles long.

Many improvements have been made both in receiving and sending messages. When the first messages were sent, the greatest speed was only about six words a minute; through the Atlantic cables to-day the average is fifty words a minute and they can work up to just double that number. By the code system, one word stands for a number of words or a phrase, and it has the advantage of being secret also.

THE NEXT FAMILIAR THINGS ARE ON PAGE 4801.

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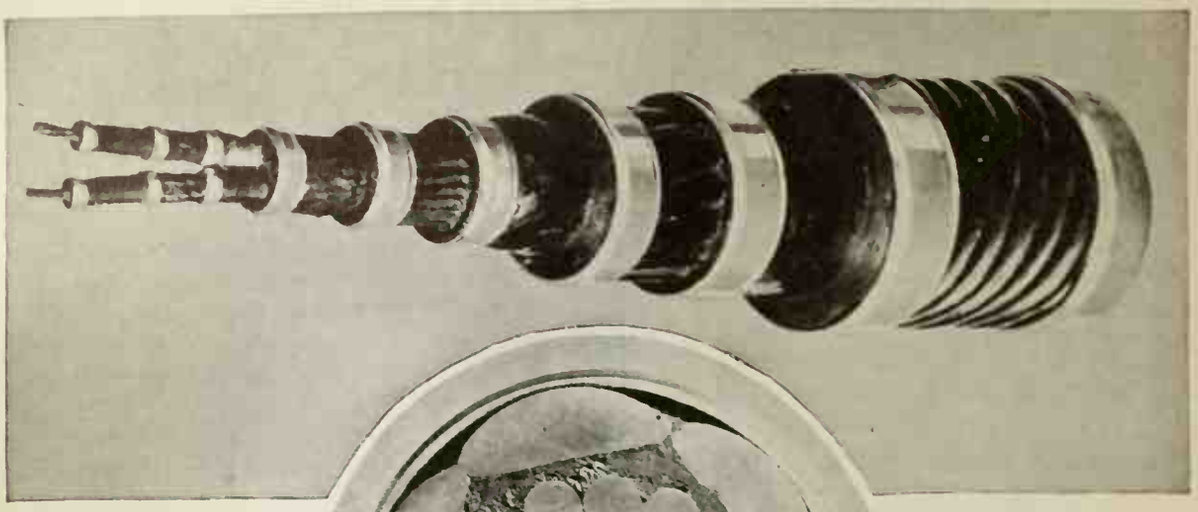
THE WIRE THAT RUNS UNDER THE SEA

One of the most wonderful things in the world is the way in which a thought can be flashed across the earth, quicker than a messenger can carry a letter across a town. Every day messages are sent under the sea by means of electric cables lying along the ocean-bed. The question answered on the previous page deals with this great achievement of man, and the pictures in the following pages show us how the cables are laid.



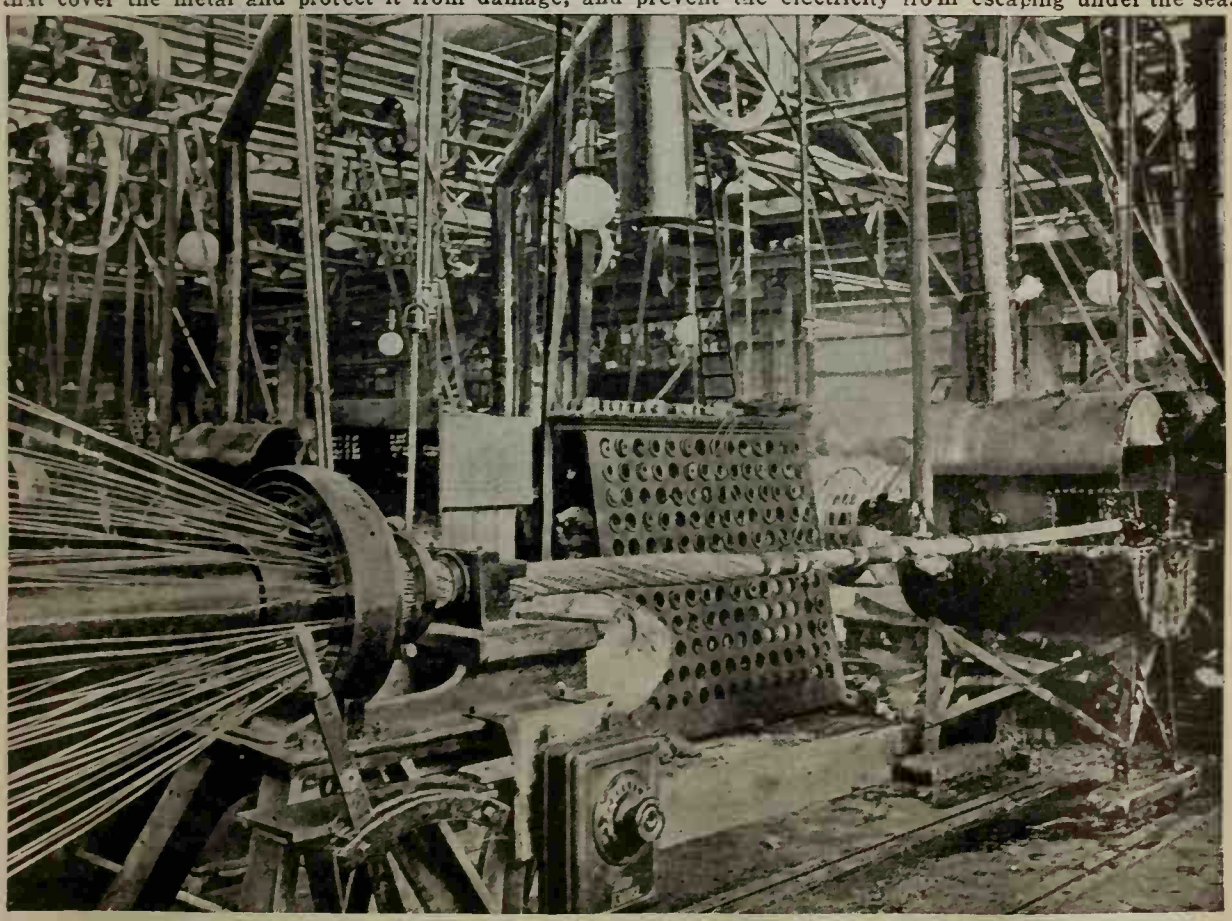
When we cable abroad, electricity carries our message through a thin wire under the sea. The wire would snap if it were not protected by coats of gutta-percha, tar, hemp, lead, or brass, and steel. A cable is thickest at its shore end.

In the top picture we see a piece of cable with the different layers cut away a little to show them clearly. It is the two thin wires at one end that carry the message. The picture in a circle shows a section cut across the same cable.

Marine plants and sea animals fasten and grow upon the cable at the bottom of the sea, as may be seen in this picture. Sometimes a cable is pulled to the surface with a large piece of coral growing all round it, or some big fish is mixed up with it. These were the greatest difficulties that the early layers of deep-sea cables had to fight against and learn how to overcome. Some years ago something went wrong with a cable near Valparaiso, in South America. When it was hauled to the surface, there was a dead whale with the cable coiled round its body. Such incidents are not uncommon, hence the need for great strength in the cable.

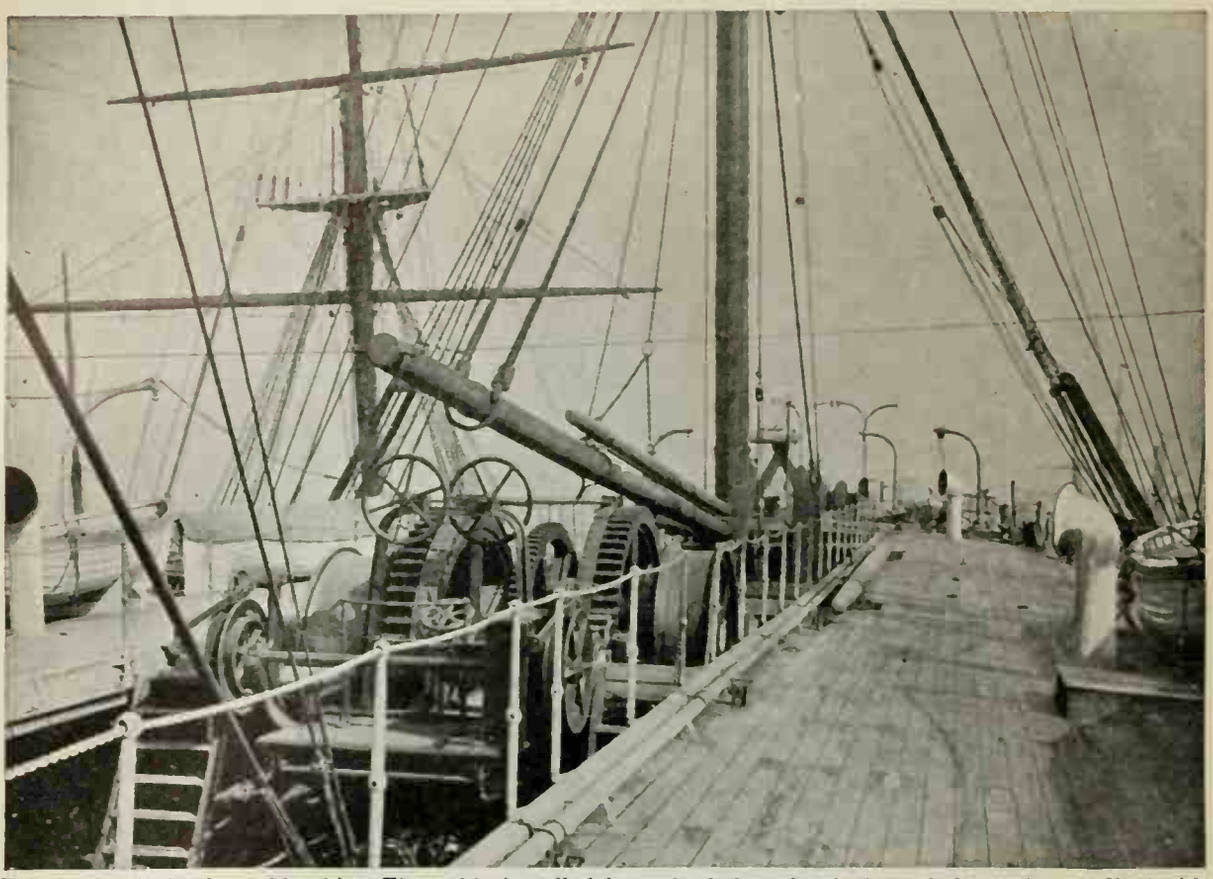
MAKING THE CABLE FOR THE OCEAN-BED

Here is a submarine cable in the course of being made. The men are putting on one of the many coats that cover the metal and protect it from damage, and prevent the electricity from escaping under the sea.



In this picture we see how the cable, after it is covered with gutta-percha, is bound firmly with wire. Every detail of the work must be most carefully done, for if there were any flaw the cable would be useless. The pictures on this page are from Messrs. Siemens & Halske's book on the Bodensee Kabel.

THE SHIP THAT LAYS THE CABLE



This is the deck of a cable-ship. The cable is coiled in tanks below the deck, and the tanks are filled with water to prevent the cable from becoming too hot or too cold. The machinery in the middle of the deck is for pulling the cable from the tanks and dropping it in the sea behind the ship as the vessel moves along.

When the ship is ready to lay the cable, the end is pulled to shore by a small boat. The cable would be damaged by dragging over the sea-bottom, so it is supported by buoys, as we see in this picture. When the end has been fixed at the cable station the buoys are removed, and the cable sinks to the ocean-bed.

BRINGING THE CABLE TO SHORE

After fixing the cable ashore, the ship steams away, and the cable passes over a drum, as seen here, and then over the side of the ship. A vessel cannot carry a very long cable all at once, so it has to return to land for a second instalment.

A buoy is put to mark the place where the end of the cable is dropped. When the ship returns, the end is hauled up and joined to the new cable.

When the cable has been laid across the ocean, then the end must be taken ashore to be fixed in the cable station, just in the same way as we saw it done at the beginning of the long operation. Here the cable is seen supported on barrels from the ship to the shore, and the shore part is being placed in a trench.

LOWERING AND RAISING A CABLE

The cable is now laid under the sea, except where it is still held by ropes from the ship. The rope which holds it is now laid across a wooden block, and a man with an axe cuts the rope. Then the cable sinks to the bottom of the sea, and as long as it carries the messages properly it is allowed to remain undisturbed.

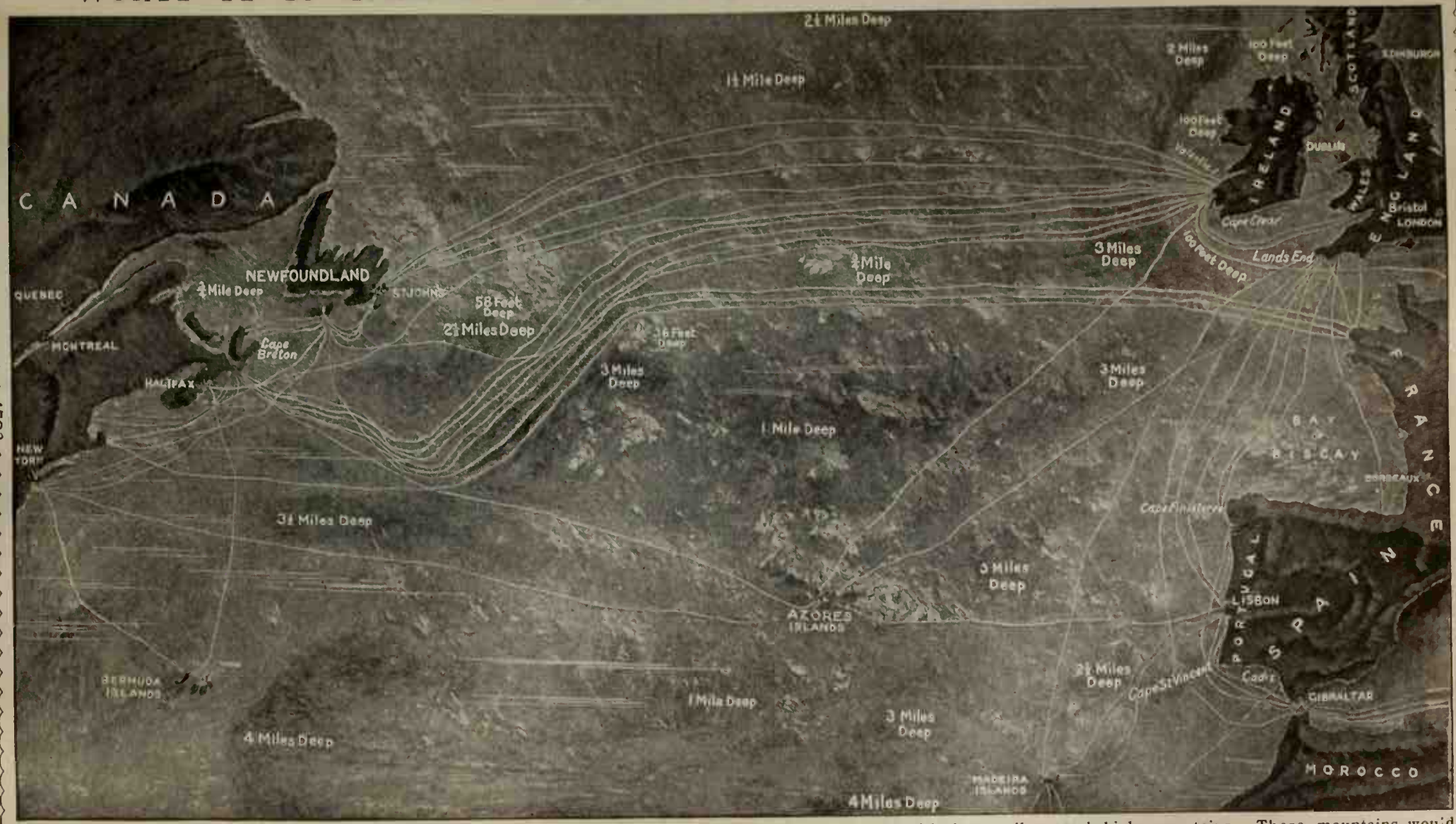
If the cable does not work well, it must be raised to find what is wrong. In this picture we see a collection of the curious grapnels, or grappling-irons, used for catching hold of a cable at the bottom of the sea.

These men are using grapnels. They can tell when the cable has been caught by the grappling-iron owing to the jerk of the rope or chain that holds it.

When a cable is hauled up, a man is swung over the side of the ship to fasten a rope to it, as shown here, and then the cable is pulled on board for repairs.

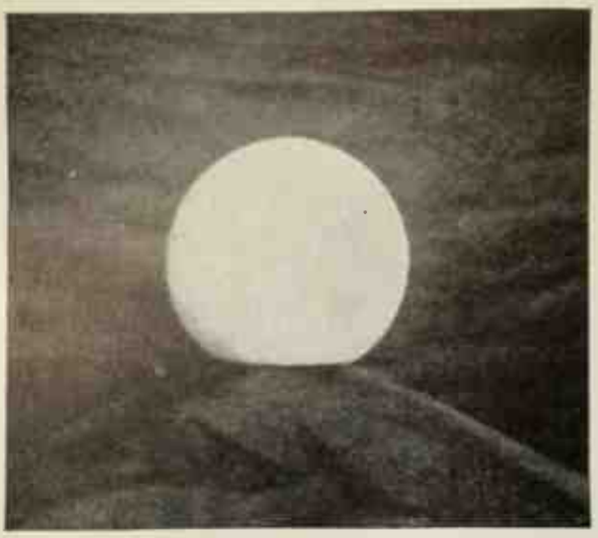
The photographs on these pages show the work of the Commercial Cable Co. and the great India-rubber Co., at Silvertown, London.

WHAT IT IS LIKE AT THE BOTTOM OF THE ATLANTIC OCEAN



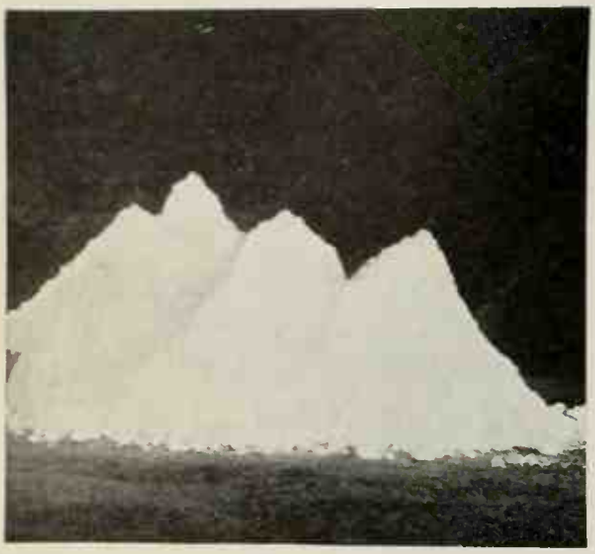
If the water in the Atlantic Ocean could be drained, the ocean-bed would look like a great stretch of country with deep valleys and high mountains. These mountains would be the islands that now only peep above the waters. Stretching across the new country we should see the many cables that enable the Old World and the New to talk together.

MOUNTAINS AND THE MOON ON A TABLE



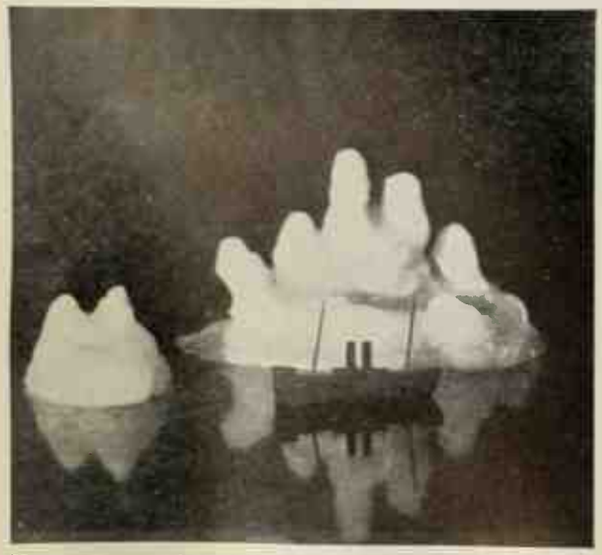
We see here the picture of an ordinary tennis-ball. By arranging the lighting of this object in a certain way, a clever photographer gets a remarkable result.

This is not a photograph of the moon, but of the tennis-ball in the first picture. This striking effect is obtained by letting the light fall only on top of the ball.



From ordinary table-salt we can build a fine range of mountains, as seen in this picture. When photographed, these will look exactly like a real range of snow-covered mountains, as shown in the next picture.

No man has climbed to the top of these mountains. If we attempted to set foot upon them we should crush them; they are made of salt piled on a dining-table, and cleverly lighted while being photographed.



Here we get what seems to be a representation of the huge icebergs that Shackleton met with on his Polar expedition. As a matter of fact, the picture shows candle-grease on glass with a paper boat.

The Alpine scene in this picture is built up of coal and alum upon a dining-room table. The little chalets, or cottages, are those tiny toy houses that we sometimes see displayed for sale in the shops.

PHOTOGRAPHY ON A TABLE

CONTINUED FROM 4620

WE have heard it said that the "camera cannot lie"; but nowadays this saying is hardly true. It may have been true years ago, when very little was known about photography, but it is really quite easy now to make cameras tell very big stories indeed. By carefully choosing and arranging a few quite ordinary articles, some very curious or beautiful pictures may be obtained, so that we can never feel quite sure that the photograph we are looking at is really what it seems to be. The pictures on page 4704 are none of them what they appear to be; they are made up, or faked, and a brief description of the way in which they were obtained will enable any boy who possesses a camera to arrange similar scenes for himself.

Table-top photography is very interesting, and provides plenty of employment and amusement during the winter and on dull, wet days, as bright sunshine is not necessary to obtain good results. The idea is to obtain negatives of mimic landscapes which have been built up from anything that seems suitable. Very few preparations are necessary. The scenes must be arranged upon a steady platform, such as a table or an upturned box. The background is merely a good-sized piece of cardboard, propped up by means of a few heavy weights. Upon this background paper of different tints may be pinned, or we may attach masses of cotton-wool to imitate the sky and clouds.

It is just as well to have two screens, which may be set up on one side or on both sides of the stage for the purpose of shutting out the light—a strong top light often being better than any other. Any odd piece of stout card or thin board will serve the purpose. The camera should be set up opposite the stage, and should be furnished with a lens of fairly wide angle.

Very few people looking at the picture of what appears to be a new moon would imagine that they were only gazing at the photograph of part of a tennis-ball. Yet that is really all it is. In order to photograph the real moon very costly apparatus would be necessary, and only men who have had a great deal of experience in photography would be able to do it; but a very good imitation may be obtained at little or no cost.

The photograph should be taken at night, as the room must be quite dark. We must use a black cloth for a background, draping one end of it over a small box, and place a white tennis-ball on the top of this, as we see in the first picture on page 4704. We ask someone to hold a light close to the ball while we are focusing, to enable us to get the rim of the "moon" quite "sharp." When all is ready we blow out the light, take the cap off the lens, and burn a strip of magnesium wire, holding it in such a way that the full light falls upon one side of the tennis-ball. The resulting picture will be very puzzling to those who are not in the secret.

A photograph of real lightning, too, would be difficult to obtain, but we may get a very good imitation of this by means of a sheet of smoked glass. We smoke the glass by passing it rapidly over the flame of an oil-lamp, taking care not to hold the glass too near the flame, or it will crack. Then we mark the track of the lightning upon the smoked surface with the point of a sharp pencil, copying, if we like, a genuine photograph of sheet or forked lightning. We prop up the sheet of glass with the help of some boxes so that a light held behind it will shine through the scratches. A lighted candle must be placed behind the glass in order to focus, and when our preparations are complete we make the exposure by burning a strip of magnesium wire, or a little magnesium powder, in the place where the candle stood. If we stand the glass upon a piece of looking-glass, a good reflection, as though in the waters of a sea or lake, may be obtained.

To make a scene like the second picture in the centre of page 4704, we drape a grey

cloth to make a "cloudy" background and pile up a quantity of powdered salt or alum or sugar to form peaks and ridges, as in the first picture in the centre of page 4704. We focus so as to take in only the summits, and make the exposure as before by burning magnesium wire, taking care that the strong light falls well from one side. The result will be a very pretty picture of sunrise on the mountains.

The dangerous-looking icebergs in the first picture at the bottom of page 4704 are really nothing more than harmless little pieces of candle-wax. We soften the wax by gently warming it, press it into shape, and stand it upon a sheet of looking-glass. A little ship, cut out in dead-black paper and placed so that it rides above the reflection of the bergs, will add greatly to the general effect.

It is surprising how many things may be made to do duty in table-top photography. Carefully selected pieces of coal may be piled up to form mountains. Powdered salt, or alum, makes very good imitation snow. A moss-covered twig is an excellent tree. Little china figures or small dolls will take the place of people. Water may be imitated by a looking-glass, or, better still, by a black cloth covered with a sheet of ordinary glass, for a less brilliant and more natural reflection is obtained in this manner.

Little figures cut out of black paper may be used in all sorts of ways. Models, too, are very handy. In the last picture the house is a little model châlet from Switzerland, set up on a coal "mountain," well sprinkled with alum "snow." An almost endless variety of pictures may be obtained by pressing toy trains, carts, or dolls' houses into service, and, working on these lines, an ingenious boy will soon have a number of interesting pictures which will well repay him for the pains he has taken in obtaining them.

THE SUSPENDED PENNY

THIS trick, to be effective, should be performed with a coin borrowed from the company, which therefore cannot be suspected of being prepared in any way. The penny really used is one into the face of which the sharp end of a needle has been brazed, in such a manner that it shall form a tiny hook, less than an inch long, pointing towards the centre of the coin, as in our first picture. A watchmaker or silversmith will prepare a penny for you in this way at a cost of a few cents.

1. The penny prepared.

This coin the performer substitutes for the borrowed one, quietly laying this last behind some object on his table, where it will be readily available at the close of the trick. Showing the prepared coin in its place, he proceeds to "magnetize" it, by breathing on it and making mysterious "passes" over it. After doing this for a minute or so he explains that the penny is now under magnetic influence, and by virtue of such influence will remain suspended wherever he chooses to place it. This it does accordingly, attaching itself with equal facility to the cloth of his vest, the tip of his ear, the back of his hand, the tip of his forefinger, as seen in picture 2, or even the tip of his nose, as shown in picture 3.

2. Suspended from the forefinger.

3. Suspended from the nose.

This is done by means of the little needle-point before mentioned. Though the point does not penetrate to any perceptible extent the surfaces against which it is laid, it does so just enough to support the weight of the coin. Strange to say, no pain or inconvenience is caused, even to the most delicate skin, by the coin being suspended from it.

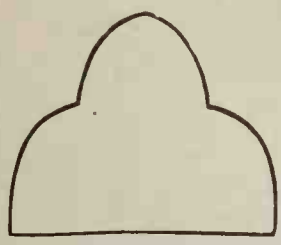
This is because the needle-point barely punctures the skin, and therefore it cannot possibly hurt, as we can easily prove for ourselves by taking a needle and gently pricking the surface skin of our finger or hand. At the close of the trick, the prepared coin must again be secretly exchanged for the borrowed penny, which has been lying meanwhile on the table. The young wizard will find the following an easy and effective way of doing this. The performer has on his table a card, either one of a pack or some other card of about similar size. As a sort of final test, he remarks: "If the influence is strong enough, the penny will even hang on to a card." He picks up the card, and makes the attempt, or, rather, pretends to do so, but purposely fails. "No, the penny is getting tired; I must magnetize it a little more." He lays down the card upon the borrowed coin, and pretends to "magnetize" the prepared one as he did before. He then picks up the card again, but secretly brings up with it the borrowed coin, held against the back of it by the fingers, the thumb lying on the face of the card. Again he endeavors to make the prepared coin attach itself to the card, but again fails. "It is no use," he says; "the power is exhausted. I return your penny, with many thanks." So saying, he brings the card into a horizontal position, and lays the prepared coin upon it, with its edge just beneath the tip of the thumb.

The performer then moves towards the lender, carrying the coin on the card, but just before he reaches him slopes the card towards himself, and lets the coin slide off into his left hand, with which he returns it to the owner. In reality, however, it is not the prepared coin which he lets fall into the hand, but the borrowed coin from the back of the card, the thumb holding back the one while the fingers release the other. If this is neatly done, no one will suspect for a moment that the coin has been changed.

When practising, it is a good plan to stand before a looking-glass to note how the trick will appear to the company, for a trick which is clumsily performed will give very little pleasure or satisfaction to the audience.

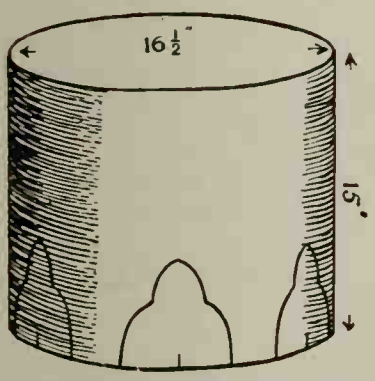
A TABLE MADE FROM A CHEESE-BOX

WITH a discarded cheese-box—the large kind of cheese-box that holds the biggest cheeses made—we can, with very little trouble, make a very convenient low table that will do well to stand in the hall or parlor, or that will do very nicely in the nursery, as it will be just the size for small children to use comfortably at their play. First, we get an empty cheese-box, which will be about fifteen inches deep and about sixteen inches across. Any box having about these dimensions will be satisfactory. We take off the lid, and mark the edge of the top where the lid was into eighteen equal spaces.



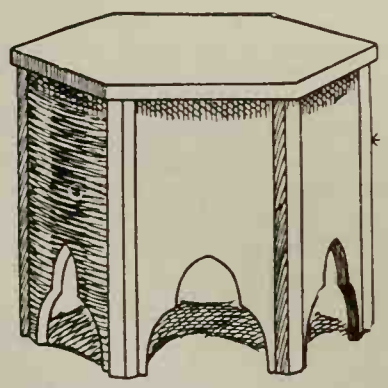
1. The paper design.

The best way to do this is to put a string right round it, and then measure the length of the string afterwards, dividing the length by eighteen, which will give us the length between each of the eighteen marks that we shall make. The length of the string in measuring the box we have described will be about fifty inches, and the distance between each of the eighteen marks will therefore be just about two and three-quarter inches.



2. Cheese-box with designs cut.

Whatever the distance between the marks may be, we make a design which must measure double that distance, so that the design will probably be about five and a half inches across. Picture 1 shows such a design. We place it upon the side of the box close up to the edge, and between two of the marks we have already made. Then we make a pencil-line on the box right round by the edge of the design. Then we do this right round the box, six times in all, missing one clear space between each design, as indicated by the finished table in picture 3.



3. Cheese-box table when finished.

Now, with our fret-saw, we cut out all the shapes we have made on the side of the box. This will give us six legs for our table, with ornamentation between the legs. Now we may strengthen the legs with advantage by having six strips, one inch broad and half an inch thick, which we put on outside, in the middle of each leg, screwing them on with three-quarter-inch round-headed screws from inside the box, and afterwards sawing off the ends square with the bottom of the legs and with the top of the table. Now we make a top for the table, putting on planed pieces of wood half an inch thick, and cutting them from corner to corner of the leg strips, thereby making a six-sided table-top. If the top piece is all in one piece, so much the better. If not, the pieces of which it is composed should be planed quite square on the edges and fastened together while they are being put on. They should be screwed on with three-quarter-inch screws from inside the box—that is, from the under side of the table. These screws will not be long enough to show through the table-top. Plenty of screws should be put in so that the top will not warp easily. After the edges have been sawn off, they should be planed and then sand-papered, after which the table may be stained, or varnished, or enameled any color desired, to make it look attractive.

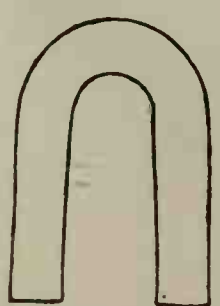
This table could also be used as a stand for a pot containing a fern or plant, and could be placed in a corner of a landing or hall.

THE PROBLEM OF THE HORSE-SHOE CARD

SOME boys and girls were sitting at a table, enjoying themselves on a wet afternoon by cutting out paper letters and figures with scissors. After a time they became tired of this game, and, to amuse them still further and keep them quiet, their uncle said he had a puzzle to give them, and would offer a prize to any of the children who could solve it correctly.

"What is it, uncle?" cried all the boys and girls. "We shall certainly solve the puzzle."

Then the uncle said he was going to cut out a piece of paper, and the puzzle was to give this paper just two cuts with the scissors, and by doing that to cut it into *seven* pieces. At once the boys and girls asked if they might fold the paper; but the gentleman said no folding was allowed—the paper must be kept flat, and two straight cuts given. The piece of paper he gave them was shaped something like a horse-shoe, as seen in the small picture here. It was three inches high and two inches across. The boys and girls puzzled themselves for a long time; and the uncle fulfilled his object of amusing them, but none of the children could do the task. At last they grew tired of trying, and asked their uncle to show them how it was done. Taking the card in one hand and the scissors in the other, he gave one cut; then, putting the pieces side by side, he gave another cut, and there were the seven pieces. How was the card cut? The solution will be found on page 4830.



The shape of the piece of paper.

A SIMPLE MUSEUM FOR BIRD LOVERS

THE cruel habit of shooting every rare or pretty bird that might be seen flying in the air, or perching on a tree, or resting on the water, is slowly passing away as our knowledge increases. It was at one time supposed to indicate a love of Nature if a person had a large number of stuffed birds under glass cases in his house—that is, if he himself had killed the birds or had encouraged someone else to kill them by paying money for such objects.

A COLLECTION OF FEATHERS

Now, however, many boys and girls are members of a national organization which pledges protection to birds. Most of us are wise enough to know that it is much better to let a rare or beautiful bird live to delight us and others by its song, or its graceful flight, than to kill it and have it stuffed badly, as is usually the case, and put under glass. If we want to study birds at close range, we can always go to a museum for the purpose, where, speaking generally they are much better stuffed and mounted than in private collections.

But if we are lovers of birds and want to start a collection of some kind bearing upon our hobby, we can make a really valuable and instructive museum by collecting the feathers of birds. This must, of course, be done in a proper way. No mere jumble of all sorts and conditions of feathers is of any use, nor would it be at all interesting or beautiful. We must get the right kind of feathers, and must arrange them all in order.

WHEN FEATHERS ARE PLENTIFUL

The beauty of making a collection of feathers is that we do not have to kill the birds, and this in itself must be an immense satisfaction to every true lover of Nature. Feather-collecting is, of course, a hobby more especially for the country, and the best time to pursue the hobby is during the autumn and winter months.

In early autumn the birds are molting, and we may pick up in the fields and by the roadside many feathers that form excellent additions to our museums. Then, later in the autumn, many an unhappy bird comes to grief on his passage to the sunny South, and we may often find, lying about, the bodies of birds that have been killed by flying against telegraph wires. In such cases we get not merely isolated feathers, but whole wings. We may often find, too, the remains of smaller birds that have been pounced upon and killed by minks or hawks, and here again we can sometimes obtain complete wings in excellent condition.

Although feather-collecting can be best carried on in the country, it is not confined to the country. It is a hobby that we can practise in the suburbs of large towns, and many a pretty and useful feather for our collection may be found in the public parks. Most park-keepers will be quite willing to give us any feathers that are lying out of our reach, if we tell them why we want them. Birds begin molting just after the breeding season, and one or two pairs of wing-feathers are changed at a time, which allows all the wing-feathers to be changed during the season, ready for the migrating period, without affecting the balance of the bird in flight. For their weight, a bird's wing-feathers are among the strongest things in all Nature.

HOW TO KEEP FEATHERS

There are various ways of keeping the feathers. Small ones may be mounted between old negative glasses, which enables both sides to be examined very easily; but everyone has not a supply of the glass sheets available. Perhaps the cheapest method is to mount the feathers on sheets of stiff cartridge paper, keeping them in position with thin strips of gummed paper—ordinary stamp-edging will do very well. Or slits may be cut in the mounts, and the feathers slipped through.

The feathers should always be placed roughly in the position they occupied in the bird's wings, or on its body; and as we find fresh feathers, so we can gradually fill up the vacancies in our collection. A separate sheet of paper should be used for each bird. It is astonishing how pretty and effective a collection of feathers arranged thus, in scientific order, will appear. Each wing-feather has a name; and the correct names or numbers should be written against them, and the name of the bird in the top right or left-hand corner of the sheet. We can find the proper names of the different feathers by consulting any good bird book at the local public library.

WHAT THE FEATHERS TEACH US

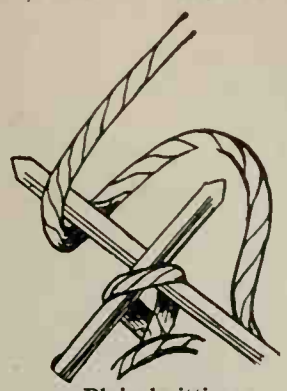
A good deal of valuable natural history is to be learned from a collection containing wings and wing-feathers. When the feathers are arranged in order, we can see the general shape of the wing, and from that shape we can learn a great deal about the habits of the bird.

We should expect birds of the weakest flight to have the simplest kind of wings, and this is the case. The wren, for instance, with its short, whirring flight, has a wing uniformly round in shape. The partridge, too, has a wing remarkably like the wren's in shape, and it also flies very much as the wren flies. Then, by a little use of our reason, we should expect birds of weak and short flight like these to live a good deal upon the ground, and that is the case; so that from the wings we can actually reason out the habits of the birds.

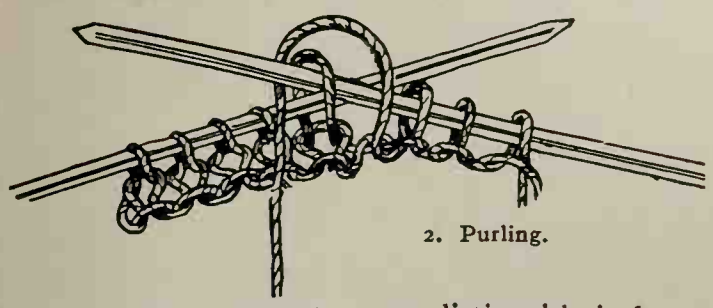
On the other hand, if a bird has a long, sharp wing, something like an arrow-head in shape, we should expect that it would be a swift flier, its wings cutting through the air like a knife-blade. And we should further reason out that birds of this kind are forced to fly rapidly in order to protect themselves, and must therefore be particularly the victims of birds of prey. This is perfectly true. The wings of teals and plovers are of the shape described, and their life is one long, sharp flight to escape from hawks and other birds of prey. These are only a few of the many interesting lessons that we may teach ourselves from a good collection of feathers.

HOW TO KNIT A CHILD'S SOCK

ANYONE who wishes to knit a sock should first practise plain knitting with the knitting needles. These are, at first, more trouble to handle than a crochet hook, until one gets accustomed to them; but after some practice the work can be rapidly done, so that many knitters hardly notice what their fingers are about, and can read while working. The stitches are formed on a long eyeless needle held in the left hand, regulated by the thumb and first finger, the other fingers steadying the needle. The right hand holds the second needle with the wool placed under the little finger, over the top of the third finger, under the middle one and over the first. In this way the supply of wool to the right needle is controlled. If we look at picture 4, on the next page, we shall see exactly how the needles should be held.



1. Plain knitting.



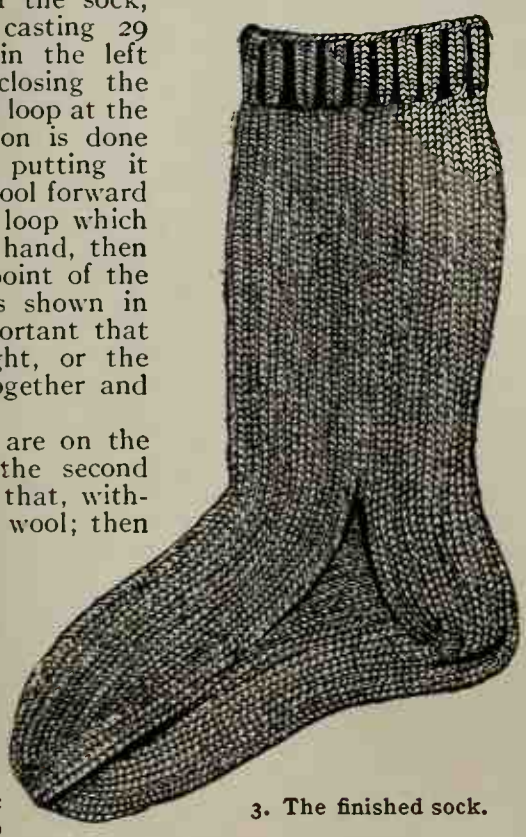
2. Purling.

A pair of socks for a child of about the age of three, if knitted in the way described here, would use up 2½ ounces of Andalusian wool or rather fine yarn. It can be knitted on four steel knitting needles, size 16.

We start with the leg of the sock, beginning at the top by casting 29 stitches on a needle held in the left hand, with the fingers enclosing the needle, after tying on to it a loop at the end of the wool. Casting on is done by taking another needle, putting it into the loop, bringing the wool forward and drawing it through the loop which is on the needle in the left hand, then placing this loop over the point of the needle in the left hand, as shown in picture 5. . It is very important that the wool is not drawn tight, or the stitches will be too close together and difficult to knit.

When all the 29 stitches are on the first needle, we take up the second one and cast 24 stitches on that, without, of course, breaking the wool; then do the same with the third needle. We have now three needles forming a triangle, and holding altogether 77 stitches.

Knitting, or, to give it its correct name, plain knitting, is done in the following way: We insert the point of the right needle through the stitch on the left needle so that it comes out on the other side of it. Then, with the first finger of the right hand, the wool is looped over the point of the needle in the right hand, drawn through the stitch, and the left needle withdrawn. This sounds very complicated, but plain knitting is really easy when we hold the needles properly. We are really making a stitch on the right needle before withdrawing the left one. We must look very carefully at picture 1. After taking another stitch like the first one, we make quite a different one, called a "purl" stitch. Purling is done by bringing the wool in front of the right needle, putting this through the front part of the stitch on the left needle, then twisting the wool round the right needle, passing it through the loop, and lastly withdrawing the left needle. It is really knitting on the reverse side. Now look at picture 2. We take another purl stitch, and then repeat the two plain stitches and the two purl three times; next knit 2 plain stitches and 1 purl. This last purl stitch is going to make the seam stitch down the back of the sock, so we distinguish it by tying a little piece of white cotton on to it. We now continue knitting 2 plain and purling 2, or, as it is briefly put, knit 2 and purl 2, to the end of the needleful. Then we knit 2 and purl 2 till the stitches on the second and third needles are off.



3. The finished sock.

If we look at the sock in picture 3 on this page, we see that the upper part of the leg is different from the rest. It is what we call ribbed, or welted, to prevent the sock slipping down the leg. The furrows beside a rib are caused by the purl stitches.

We want 23 more rounds like the first one, and when these are done we knit 16 plain ones, but always purling the seam stitch when we come to it.

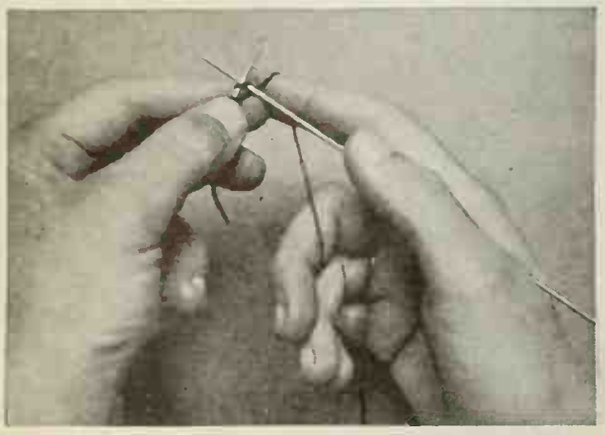
By this time we must think of *decreasing* our stitches, because the leg gets smaller towards the ankle. So in the next round we knit plain until we reach the third stitch before the seam stitch, and then knit 2 together. To do this we put the needle through 2 stitches and knit them as though they were one. Then we knit 1 and arrive at the seam stitch, which we purl. After that we decrease in another way by knitting 1, "slipping" 1—done by lifting the stitch on to the right needle—knitting 1, and with the left needle

drawing the slipped stitch over the one just knitted. The round is finished plain. The next five rounds are plain, and the sixth is like the one described above, which decreases.

These six rounds are repeated four times, and by then we have only 17 stitches on the first needle, the odd one in the middle being the seam stitch, while there are still 24 on each of the other two needles.

The leg of the sock is finished with 20 more plain rounds.

It is now time to start the heel of the sock. This we do by knitting 8, purling the seam stitch, knitting 8, and then knitting 8 on the second needle. We now turn the work and go back again, slipping the first stitch and purling 15 till we are back at the seam stitch again. This we knit plain; then purl the next 16. There are now 33 stitches on one needle; they are called heel stitches, and, leaving the other 32 to form the instep later, we turn our attention to these heel stitches, knitting 1 row and purling 1 row till we have



4. The correct way to hold the knitting needles.

28 rows, and taking care to slip the first stitch, but retain the seam stitch.

Now for the heel we slip the first stitch, knit 6, make 1—that is, make two stitches on the same stitch, one on the front and one on the back of it—knit 2 stitches together, knit 4, again knit 2 together, and then knit 1.

We are now at the seam stitch, and, after purling it, we continue to knit 1, slip 1, knit 1, draw the slipped stitch over, knit 4, slip 1, knit 1, and draw the slipped stitch over. It is now necessary to turn again, so we make 1, and purl to the ninth stitch after the seam stitch. The next time of turning we proceed as above from "make 1" and continue till all these side stitches are knitted, but in the last turn omit the first stitch before purling.

We should now have 15 stitches for the top of the heel. We knit 15 plain from them, and take up and knit on the same needle 15 stitches that are on the side of this piece.

Next we can return to the 32 instep stitches and knit them plain on to one needle. The 15 stitches on the other side of the heel are also taken up, and 7 stitches knitted on to the top of the heel.

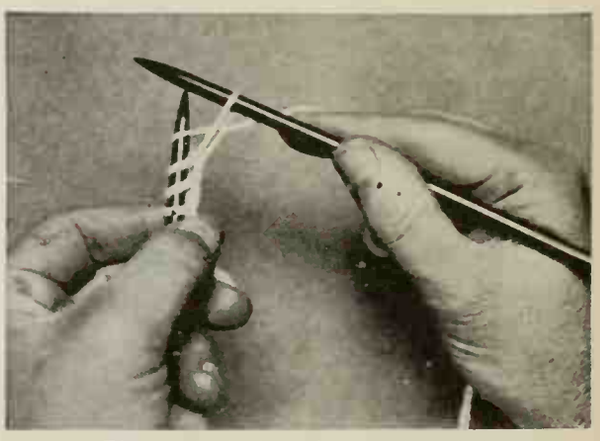
If we count our stitches correctly, we shall now find that we have 77, the number with which we started on the three needles.

To make the gussets at the sides, we start with the first of the two foot needles by knitting 1, slipping 1, knitting 1, and drawing the slipped stitch over. That is to decrease; then we knit plain to the third stitch from the end of the second foot needle, and dispose of these by knitting 2 together and knitting 1. There is still the instep needle, which we knit plain, and follow that by knitting 2 rounds.

This knitting for the gussets we repeat till the round consists of 65 stitches, 33 stitches on two of the needles, and 32 instep ones on the third. After knitting 30 rounds we give our attention to the toe of the sock.

The toe is naturally obtained by decreasing. We knit 3, slip 1, knit 1, draw the slipped stitch over, knit till we reach the fifth stitch from the end of the second foot needle, and finish by knitting 2 together, and then knitting 3.

There is now the instep needle. This we dispose of by knitting 3, slipping 1, knitting 1, drawing the slipped stitch over, and at



5. The method of casting on the stitches.

the fifth stitch from the end knitting 2 together and then knitting 3. Two plain rounds follow.

These toe rounds are repeated three times, but then a decrease round alternates with a plain round until only 25 toe stitches remain. The 13 foot stitches are now transferred to one needle, which is placed alongside the instep needle, and 2 stitches knitted through together; but as there is an odd central stitch on one needle we dispose of that by knitting 3 together. We make the last loop large enough to pass the ball of wool through it, draw the wool tight and cut it about 1 inch from the sock. That finishes the sock, which should now look like that shown in picture 3 on the previous page.

Hand-made socks and stockings not only are warmer than the machine-made ones, but they wear better and last much longer, so that they are always in demand. Those of us who are beginning to think of Christmas presents will find that a pair of stockings is a very acceptable gift to either the golfer or the cyclist. As far as the actual number of stitches is concerned, of course, the instructions given above will be useless; but, having once grasped the idea, we shall find that we have no difficulty in carrying out any pattern which we may fancy to copy.

POULTRY-KEEPING AS A HOBBY

POULTRY-KEEPING as a hobby is comparatively inexpensive, and the new-laid eggs we shall get from time to time will be some recompense for the trouble the fowls entail.

If we decide to keep fowls, and think that we are going to make money thereby, we may find ourselves very much mistaken after a few months of experience. When we begin to reckon up the cost of the fowls and the fowl-house, with all the little things needed for it, and add up what we have spent upon grain, we may find that the eggs have cost us more than those which we should have purchased at a shop, and that there is nothing for all the time and trouble expended upon the birds.

It may pay to keep fowls if there is plenty of food for them that would otherwise be thrown away, or if there is a yard where they can pick up all they want; but if the greater part of the food has to be purchased, we shall probably find that they are an expense. Therefore, it is not wise for us to imagine that we shall make a large profit from them.

The kind of hens that we should purchase will depend upon two things—whether we wish to have pretty birds, or as many eggs as possible. Let us assume that we desire eggs, in which case we should choose those which are called non-sitting hens, such as Minorcas and Leghorns. These fowls lay well and give good-sized, white-shelled eggs. Also, they thrive much better, as a rule, than many other breeds when they are kept in rather confined quarters.

An ordinary lean-to fowl-house, with wired-in run.

We will now consider the fowl-house and run. This should, if possible, be a wooden building of what is called the lean-to kind—that is to say, it should be as seen in picture 1. The bigger it is the better. It should be not narrower than four feet, and as long as possible. It should be covered on top and at both ends, and, if possible, it should be put up facing the sun. The health of the birds demands that we should give them a proper kind of floor, because if they have a soft earth floor, they are sure to turn sick and pine when the wet weather comes. We should first get plenty of big stones, broken brick, and other dry rubbish, and spread it over the floor until it is about six inches deep. Then we should spread on top of that some gravel, sand, and ashes, to the depth of a further three inches.

At one end a space should be shut in so as to make a sleeping, or roosting, chamber; and into this we should put perches and nest-boxes, taking care not to unduly crowd the birds. The roosting chamber should be well ventilated. Also, it should have a door communicating with the run, or open-air part, this door being closed at night so as to make the birds cosy and comfortable.

The front of the run should be covered with galvanized wire netting, as seen in the picture; and there should be a door from the outside into the run, as well as a door from the outside into the roosting chamber.

If the hens are allowed out, they may possibly fly away, and the best way to prevent this is to clip the feathers of one wing. We should cut only the web of the feathers and not the quill. This is not cruel, and it effectually disturbs their balance, and thus prevents them from flying. They will not, of course, be given access to flower-beds; but if there is provision by which they can have daily exercise without doing any damage, so much the better. If they are confined to the roosting chamber and the run all the time, it is necessary to give them green food, such as sliced turnips, cabbages, or chopped grass. All scraps from the kitchen should be thrown to the fowls. Such scraps, which may include pieces of meat, hard bread, and vegetables, should be soaked in water overnight, so that they are nice and soft in the morning, which is the best time to give soft food. Three meals a day are quite enough. At noon, vegetables, cooked or green, or cooked maize may be given, but the evening meal should be grain, such as wheat or oats, which ought to be supplied not in a dish, but scattered over the ground so that the birds have to pick it up by scratching for it. There should be some small stones and grit placed in a box in the run, as that helps the birds to digest their food. Flint grit can be purchased cheaply from most corn-chandlers.

Fowls need lime, as it is from the lime which they eat that the shells of their eggs are made. The best form in which to give the lime is crushed shells, especially oyster-shells pounded fine in a mortar.

Water is necessary, and must be supplied in a fountain. Regular drinking fountains are made of tin or zinc; but an excellent drinking fountain can be made by placing a bottle full of water upside down in a dish, as seen in picture 2. The lip of the bottle should be raised from the bottom of the dish about two inches, and as the water is consumed, or as it evaporates, the level is kept up until the supply in the bottle is exhausted.

The cost of the food for the hens need not be great. It depends upon how much kitchen refuse is available for their feed, and also upon whether the grain is bought in small quantities or in large quantities. The latter always works out more cheaply. But if a fair amount of kitchen stuff is available, and if the other food is bought in bulk, the cost should not be more than a nickel a week for each bird.

Drinking fountain for fowls.

We have supposed that our fowls were to be kept only to provide us with eggs, which is the chief reason why fowls are kept. But if we want to have our hens lay eggs and hatch them, then we had better have what are called sitting hens. The varieties of fowls that we have already mentioned are not good sitters. Some of the best sitting hens are the kinds known as Rhode Island Reds, Wyandottes, Brahmas, Orpingtons, and Plymouth Rocks. But we ought to understand at the outset that if we have only a little space for our fowls in a back yard, it is a mistake to breed chickens. Chickens are apt to sicken and die unless they have plenty of room, such as they get on a farm, and it is far better not to hatch chickens if our space is limited.

If, however, we place a sitting of eggs under a hen, the young chicks will be hatched in three weeks. The following day the old hen and her brood should be placed out in a coop, and the little chicks should be given baby chick food, which is finely ground. See that plenty of fresh water is always kept within reach of the chicks.

Cleanliness is absolutely necessary in order to keep the chickens in a healthy condition; and the houses, nests, and runs should be thoroughly cleansed at least once a week.

HUNTING THE FOX AND THE GEESE

THERE is an interesting and exciting game that can be played with checkers on a checker-board, which is usually called Fox and Geese, but is much better named Fox and Hounds. It is a game of skill for two players; and five checkers are used in the game, one black, called the fox, and four white, called the geese, or hounds.

To begin the game, the players choose sides, one being the fox, and he takes the black checker; while the other, who plays hounds, takes the four white checkers. The hounds are arranged on the four black squares at one side of the board, while the fox is placed on any one of the four black squares at the opposite side of the board.

The game is for one player to make his hounds hem in the fox, while the aim of the fox is to escape through the line of hounds to the far side of the board, which means a win for the fox. The moves are made as in an ordinary game of checkers—that is, diagonally, one square at a time; but while the hounds may move only in one direction—forward—the fox is allowed to move either backward or forward, like the kings in ordinary checkers.

Given two equally skilful players, who know all the moves, the hounds are sure to hem in the fox, but unless the players are thoroughly well up in the game, there is an exciting contest, in which sometimes the fox, and sometimes the hounds, will win. Of course, no pieces are taken in the game, and the hounds always have the first move.

When we play as the hounds, the great idea is for us to keep our pieces in a line and gradually move them forward in this way; whereas, if we are the fox, we should move our piece about in such a way as to confuse our opponent and make him get his men out of a straight line. The slightest slip in the moves of the hounds will let the fox through.

THE GAME OF SNAP

THIS is rather a noisy card game, but it causes great fun. Interest never flags, and the players must be alert all the time. The cards used may be of a special kind in sets of four, each of the cards in each set being alike. Thus we may get four roses or four dahlias in a set; animals may take the place of flowers. But if we do not have such pictorial cards an ordinary pack of playing cards will do instead. In such a pack there are four kings, four queens, four aces, and so on.

Now let us begin to play. The more players the merrier the party. The cards are dealt face downwards, and no player looks at his cards. When the cards have been dealt, the player sitting on the left-hand side of the dealer begins by turning over the top card of his heap, and placing it face upwards on the table some distance in front of him, and away from his heap. The next player on the first player's left does the same thing with the top card of his pile, and so on round the table, one player after another turning his top card face upwards. While this turning up is going on, if any player notices that a card turned up is the same kind of a card—such as a rose card, a donkey card, or a king card—as the uppermost exposed card in front of himself he calls out "Snap." Whichever of the two players with similar cards calls out the word "Snap" first takes all the turned-up cards in front of the other player, and puts them beneath his unturned heap. Then the game goes on again.

Unless a player is very sharp he will lose heap after heap until all his cards have been taken, when he will be out of the game.

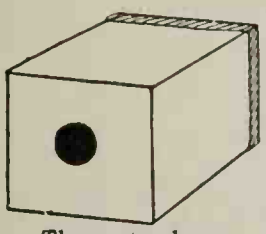
If a player calls "Snap" by mistake, the other player whose card prompted him to call takes all the caller's exposed cards. This prevents players from calling out "Snap" to every card that is turned over, in the hope that it may be like theirs.

As the game proceeds, one after another of the players loses all his cards, until finally there are only two players left in the game These two players go on until one of them succeeds in winning all the cards of the other player, when the game is at an end.

A BOX THAT MAKES SMOKE RINGS

WE have all seen those rings of smoke which some smokers can throw out of their mouths, and which have, perhaps, made us wonder. The science of the smoke rings is fully described elsewhere in this book, and while we do not want to blow smoke rings from our mouths, it will be very interesting and instructive if we can make an apparatus that will blow out the rings for us.

Such a toy is of scientific value, and can be made quite easily by any boy or girl. It is called a vortex box, the word *vortex* meaning whirlpool or whirlwind.



The vortex box.

We must first of all take a square wooden box, such as those cases in which we buy four or five pounds of tea. Then we remove the lid altogether, and at the side opposite to the opening thus formed we mark a round circle, about three inches in diameter, and, first boring a hole with a tool or a red-hot poker, we insert a small saw and saw the three-inch hole.

Now take a piece of stout canvas, a little larger than the place where the lid used to be, and nail it over the opening in place of the lid. Then glue down all round the flap that is left by the canvas being too large for the square opening. All that we now have to do to get our rings of smoke is to fill the box with smoke and tap smartly on the stretched canvas, when the rings will follow one another in rapid succession.

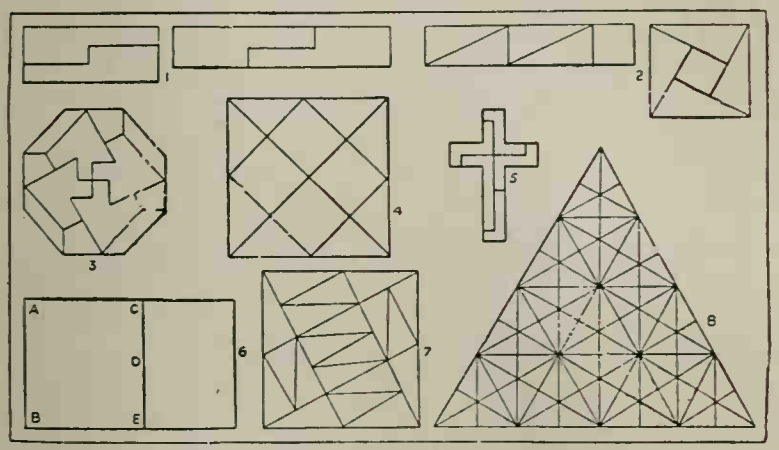
There is a way of getting a very white smoke by having openings in the side of the box, and placing through these glass tubes connected with flasks containing chemicals. The chemicals are heated, gases enter the box from the flasks, and as they combine there a white smoke is formed. But we had better not attempt such a difficult process, as it is quite simple to fill the box with smoke. We can burn coarse brown paper in the box, and as it smolders a thick smoke will be formed that will serve our purpose quite well.

After making a vortex box, we certainly ought to turn to page 3426 and learn the reasons for the rings being formed. The box can be made more amusing by painting a man's face on the side where the round hole is, letting the hole represent the mouth.

SOLUTIONS TO THE PUZZLES WITH PAPER

ON page 4615 are given a number of interesting puzzles that can be worked out with scissors and paper. These are the correct solutions to the puzzles. The carpenter who had a plank 4 feet by 1½ feet, and had to fill a hole 6 feet by 1 foot, cutting the wood into only two pieces, did it in the manner shown in picture 1.

Similarly, the carpenter who had to put a floor into a cupboard which was exactly square, using a plank of wood 15 feet by 3 feet, and cutting this into only five pieces, four of which should be equal, did it as shown in picture 2.



1 & 2. The carpenter's puzzles. 3. The octagon. 4. A square made of squares and triangles. 5. The puzzle cross. 6. The folded paper. 7. Square made of 20 triangles. 8. Triangle made of 653 triangles.

The third puzzle was to cut out four of each of three shapes and fit these together into an octagon. This is done as shown in picture 3. The eight equal squares, four of which are cut into eight triangles, if placed together as shown in picture 4, will form the new square that was required.

In the fifth puzzle there were five pieces of paper, three of which were of the same size and shape, and these had to be put together to form a cross. This is done in the manner shown in picture 5.

The sixth puzzle was very ingenious. The somewhat elaborate cross with stand and candles that was given on the same page had to be built up by folding a single piece of paper in a certain way and making not more than one cut with a pair of scissors. Four folds have to be made before the cutting is done. Suppose picture 6 to be the piece of paper. First of all, mark off the square A, B, E, C. Now fold the corner A over to E; now fold B over to C, then C to E, and, finally, from D to E. The paper thus folded must be cut lengthways along the centre, and when opened out it will be found to consist of nine pieces of paper, which can quickly be put together to form the cross and candles. In the seventh puzzle a square can be built up from twenty triangles in the manner shown in picture 7. The last puzzle was in some ways the one that gave the greatest scope for cleverness on the part of those trying to solve it. If the twenty-nine lines be drawn as shown in picture 8, it will be seen at once that a very large number of triangles, large and small and of varied shapes, are formed. But not many people would credit the very large number indeed that are thus made. Altogether there are in this large triangle six hundred and fifty-three smaller triangles.

THE NEXT THINGS TO MAKE AND THINGS TO DO BEGIN ON PAGE 4819.

LITTLE PICTURE-STORIES IN FRENCH

First line: French. Second line: English words. Third line: As we say it in English.

Un jour quelque chose s'abattit sur la fenêtre de la salle d'étude.
One day something itself fell upon the window of the room of study.
One day something flew in at the school-room window.

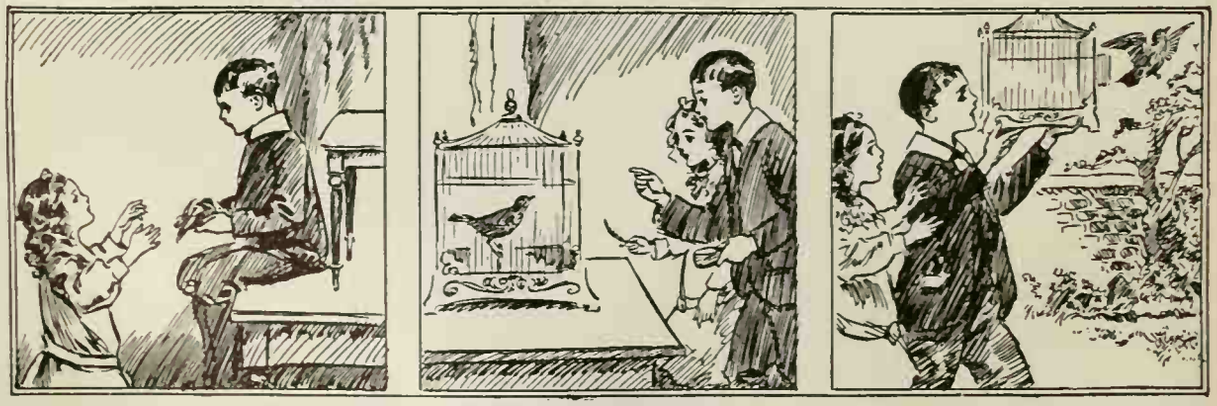
Les enfants sautèrent. "Regarde!" s'écria Ethel. "C'est une petite grive."
The children jumped. "Look!" herself cried Ethel. "This is a little thrush."
The children jumped up. "Look!" cried Ethel. "It is a little thrush."

"Essayons de l'attraper," dit Guiliaume. L'oiseau était sur les rideaux.
"Let us try of her to catch," said William. The bird was upon the curtains.
"Let us try to catch it," said William. The bird was on the curtains.

Il essaya de l'atteindre, mais il était trop petit. Il considéra un moment.
He tried of it to reach, but he was too little. He considered a moment.
He tried to reach it, but he was too short. He thought a moment.

Guillaume mit une chaise sur la table, monta dessus, et étendit la main.
William put a chair upon the table, mounted upon, and extended the hand.
William put a chair on the table, climbed up, and put out his hand.

L'oiseau ne bougea pas. "Pauvre petite grive!" dit-il. "L'aile est blessée."
The bird not stirred not. "Poor little thrush!" said he. "The wing is hurt."
The bird did not move. "Poor little thrush!" said he. "Its wing is hurt."



"Laisse-moi la voir," dit Ethel, courant à la table et étendant la main.
"Leave me it to see," said Ethel, running to the table and extending the hand.
"Let me see it," said Ethel, running up to the table and holding out her hand.

"Nous la mettrons dans une cage et nous la soignerons." "Quelle bonne idée!"
"We it will put into a cage and him will care for." "What good idea!"
"We will put it in a cage and take care of it." "What a good idea!"

Aussitôt que le petit oiseau était tout à fait bien, il désirait encore la liberté.
As soon as the little bird was all to make well, it desired again the liberty.
As soon as the little bird was quite well, he wanted to be set free again.

Les enfants ouvrirent la porte de la cage et l'heureuse grive s'envola.
The children opened the door of the cage and the happy thrush herself flew away.
The children opened the cage door and the happy thrush flew away.

A GREAT POEM ABOUT A GREAT MAN

LORD TENNYSON had only recently been appointed Poet Laureate when the Duke of Wellington died, in 1852. It thus happened that his first duty as the "official" poet was to write an ode on the death of the renowned soldier and statesman. Poems written in such circumstances have seldom been truly inspired; but this is an exception to the rule, as it is a worthy example of Tennyson's poetry. It has the true heroic ring; it is genuinely eloquent; it moves to the stately, solemn march of a great event. It also contains several lines which have passed into popular quotation, notably, "The path of duty was the way to glory." Yet almost every writer in the Press of that time denounced the poem as unworthy of the occasion. This shows that what contemporary critics say about the literature of their own time is sometimes unjust; all critics now regard the "Ode on the Death of the Duke of Wellington" in the light in which we have spoken of it.

ODE ON THE DEATH OF WELLINGTON

I.

BURY the Great Duke
With an empire's lamentation,
Let us bury the Great Duke
To the noise of the mourning of a mighty nation,
Mourning when their leaders fall,
Warriors carry the warrior's pall,
And sorrow darkens hamlet and hall.

CONTINUED FROM 4651

II.

Where shall we lay the man whom we deplore?
Here, in streaming London's central roar.
Let the sound of those he wrought for,
And the feet of those he fought for,
Echo round his bones for evermore.

III.

Lead out the pageant: sad and slow,
As fits an universal woe,
Let the long, long procession go,
And let the sorrowing crowd about it grow,
And let the mournful martial music blow;
The last great Englishman is low.

IV.

Mourn, for to us he seems the last,
Remembering all his greatness in the past.
No more in soldier fashion will he greet
With lifted hand the gazer in the street.
O friends, our chief state-oracle is mute:
Mourn for the man of long-enduring blood,
The statesman-warrior, moderate, resolute,
Whole in himself, a common good.
Mourn for the man of amplest influence,
Yet clearest of ambitious crime,
Our greatest yet with least pretence,
Great in council and great in war,
Foremost captain of his time,
Rich in saving common-sense,
And, as the greatest only are,
In his simplicity sublime.
O good grey head which all men knew,
O voice from which their omens all men drew,
O iron nerve to true occasion true,
O fall'n at length that tower of strength
Which stood four-square to all the winds that blew!
Such was he whom we deplore.
The long self-sacrifice of life is o'er.
The great World-victor's victor will be seen no more.

V.

All is over and done:
Render thanks to the Giver,
England, for thy son.
Let the bell be toll'd.
Render thanks to the Giver,
And render him to the mold
Under the cross of gold
That shines over city and river,
There he shall rest for ever
Among the wise and the bold.
Let the bell be toll'd:
And a reverent people behold
The towering car, the sable steeds:
Bright let it be with his blazon'd deeds,
Dark in its funeral fold.
Let the bell be toll'd:
And a deeper knell in the heart be knoll'd;
And the sound of the sorrowing anthem roll'd
Through the dome of the golden cross;
And the volleying cannon thunder his loss;
He knew their voices of old.
For many a time in many a clime
His captain's ear has heard them boom,
Bellowing victory, bellowing doom:
When he with those deep voices wrought,
Guarding realms and kings from shame;
With those deep voices our dead captain taught
The tyrant, and asserts his claim
In that dread sound to the great name,
Which he has worn so pure of blame,
In praise and in dispraise the same,
A man of well-attemper'd frame.
O civic muse, to such a name,
To such a name for ages long,
To such a name,

Preserve a broad approach of fame,
And ever-echoing avenues of song.

VI.

Who is he that cometh, like an honour'd guest,
With banner and with music, with soldier and with priest,
With a nation weeping, and breaking on my rest?
Mighty Seaman, this is he
Was great by land as thou by sea.
Thine island loves thee well, thou famous man,
The greatest sailor since our world began.
Now, to the roll of muffled drums,
To thee the greatest soldier comes;
For this is he
Was great by land as thou by sea;
His foes were thine; he kept us free;
O give him welcome, this is he
Worthy of our gorgeous rites,
And worthy to be laid by thee;
For this is England's greatest son,
He that gain'd a hundred fights,
Nor ever lost an English gun;
This is he that far away
Against the myriads of Assaye
Clash'd with his fiery few and won.
And underneath another sun,
Warring on a later day,
Round affrighted Lisbon drew
The treble works, the vast designs
Of his labour'd rampart-lines,
Where he greatly stood at bay,
Whence he issued forth anew,
And ever great and greater grew,
Beating from the wasted vines
Back to France her banded swarms,
Back to France with countless blows,
Till o'er the hills her eagles flew
Past the Pyrenean pines,
Follow'd up in valley and glen
With blare of bugle, clamour of men,
Roll of cannon and clash of arms,
And England pouring on her foes.
Such a war had such a close.
Again their ravening eagle rose
In anger, wheel'd on Europe-shadowing wings,
And barking for the thrones of kings;
Till one that sought but Duty's iron crown
On that loud Sabbath shook the spoiler down;
A day of onsets of despair!
Dash'd on every rocky square
Their surging charges foam'd themselves away;
Last, the Prussian trumpet blew;
Through the long-tormented air
Heaven flash'd a sudden jubilant ray,
And down we swept and charged and overthrew.
So great a soldier taught us there,
What long-enduring hearts could do
In that world-earthquake, Waterloo!
Mighty Seaman, tender and true,
And pure as he from taint of craven guile,
O saviour of the silver-coasted isle,
O shaker of the Baltic and the Nile,
If aught of things that here befall
Touch a spirit among things divine,
If love of country move thee there at all,
Be glad, because his bones are laid by thine!
And through the centuries let a people's voice
In full acclaim,
A people's voice,
The proof and echo of all human fame,
A people's voice, when they rejoice
At civic revel and pomp and game,
Attest their great commander's claim
With honour, honour, honour, honour to him,
Eternal honour to his name.

VII.

A people's voice! we are a people yet.
Though all men else their nobler dreams forget,
Confused by brainless mobs and lawless powers;
Thank Him who isled us here, and roughly set
His Saxon in blown seas and storming showers,
We have a voice, with which to pay the debt
Of boundless love and reverence and regret
To those great men who fought, and kept it ours.
And keep it ours, O God, from brute control;
O statesmen, guard us, guard the eye, the soul
Of Europe, keep our noble England whole,
And save the one true seed of freedom sown
Betwixt a people and their ancient throne,
That sober freedom out of which there springs
Our loyal passion for our temperate kings;
For, saving that, ye help to save mankind
Till public wrong be crumbled into dust,
And drill the raw world for the march of mind,
Till crowds at length be sane and crowns be just.
But wink no more in slothful overtrust.
Remember him who led your hosts;
He bade you guard the sacred coasts.
Your cannons moulder on the seaward wall;
His voice is silent in your council-hall
For ever; and whatever tempests lower
For ever silent; even if they broke
In thunder, silent; yet remember all
He spoke among you, and the Man who spoke,
Who never sold the truth to serve the hour,
Nor palter'd with eternal God for power;
Who let the turbid streams of rumour flow
Through either babbling world of high and low;
Whose life was work, whose language rife
With rugged maxims hewn from life;
Who never spoke against a foe;
Whose eighty winters freeze with one rebuke
All great self-seekers trampling on the right:
Truth-teller was our England's Alfred named;
Truth-lover was our English Duke;
Whatever record leap to light
He never shall be shamed.

VIII.

Lo, the leader in these glorious wars
Now to glorious burial slowly borne,
Follow'd by the brave of other lands,
He, on whom from both her open hands
Lavish Honour shower'd all her stars,
And affluent Fortune emptied all her horn.
Yea, let all good things await
Him who cares not to be great.
But as he saves or serves the State.
Not once or twice in our rough island-story,

The path of duty was the way to glory:
He that walks it, only thirsting
For the right, and learns to deaden
Love of self, before his journey closes,
He shall find the stubborn thistle bursting
Into glossy purples, which outredden
All voluptuous garden roses.
Not once or twice in our fair island-story,
The path of duty was the way to glory:
He, that ever following her commands,
On with toil of heart and knees and hands,
Through the long gorge to the far light has won
His path upward, and prevail'd,
Shall find the toppling crags of Duty scaled
Are close upon the shining table-lands
To which our God Himself is moon and sun.
Such was he: his work is done.
But while the races of mankind endure,
Let his great example stand
Colossal, seen of every land,
And keep the soldier firm, the statesman pure;
Till in all lands and through all human story
The path of duty be the way to glory:
And let the land whose hearths he saved from shame
For many and many an age proclaim
At civic revel and pomp and game,
And when the long-illumined cities flame,
Their ever-loyal iron leader's fame,
With honour, honour, honour, honour to him,
Eternal honour to his name.

IX.

Peace, his triumph will be sung
By some yet unmoulded tongue
Far on in summers that we shall not see:
Peace, it is a day of pain
For one about whose patriarchal knee
Late the little children clung:
O peace, it is a day of pain
For one, upon whose hand and heart and brain
Once the weight and fate of Europe hung.
Ours the pain, be his the gain!
More than is of man's degree
Must be with us, watching here
At this, our great solemnity.
Whom we see not we revere;
We revere, and we refrain
From talk of battles loud and vain,
And brawling memories all too free
For such a wise humility
As befits a solemn fane:
We revere, and while we hear
The tides of Music's golden sea
Setting toward eternity,
Uplifted high in heart and hope we are,
Until we doubt not that for one so true
There must be other nobler work to do,
Than when he fought at Waterloo,
And Victor he must ever be.
For though the Giant Ages heave the hill
And break the shore, and evermore
Make and break, and work their will;
Tho' world on world in myriad myriads roll
Round us, each with different powers,
And other forms of life than ours,
What know we greater than the soul?
On God and godlike men we build our trust.
Hush, the Dead March wails in the people's ears:
The dark crowd moves, and there are sobs and tears:
The black earth yawns: the mortal disappears;
Ashes to ashes, dust to dust;
He is gone who seem'd so great.
Gone; but nothing can bereave him
Of the force he made his own
Being here, and we believe him
Something far advanced in State,
And that he wears a truer crown
Than any wreath that man can weave him.
Speak no more of his renown,
Lay your earthly fancies down,
And in the vast cathedral leave him.
God accept him, Christ receive him.

SOLITUDE

In these lines by Lord Byron we see an unrestful spirit contemplating the mighty forces of Nature, for although the title is "Solitude," it is not of solitude he sings so much as of man warring against waves and wind, in which unequal contest man, for the moment, has no thought of his fellows, but only of himself. It is not a poem of despair, for nothing gives more zest to life than man's battle with Nature.

THERE is a pleasure in the pathless woods,
There is a rapture on the lonely shore,
There is society where none intrudes,
By the deep sea, and music in its roar.
I love not man the less, but Nature more,
From these our interviews, in which I steal
From all I may be, or have been before,
To mingle with the universe, and feel
What I can ne'er express, yet cannot all conceal.

Roll on, thou deep and dark blue ocean—roll!
Ten thousand fleets sweep over thee in vain;
Man marks the earth with ruin—his control
Stops with the shore; upon the watery plain
The wrecks are all thy deed, nor doth remain
A shadow of man's ravage, save his own,
When, for a moment, like a drop of rain,
He sinks into thy depths with bubbling groan,
Without a grave, unknell'd, uncoffin'd, and unknown.

ENGLAND AND AMERICA IN 1782

Lord Tennyson in this short poem strikes the true note and gives the proper view of our great American Revolution, when the British colonies in North America fought with the Motherland for their independence. His little poem gives us a better conception of that great event than many a long and bitter history of that terrible strife has done. It is a manly and noble view of a great event in the world's history, which was inevitable for the progress of mankind.

O THOU that sendest out the man
To rule by land and sea,
Strong mother of the Lion-line,
Be proud of those strong sons of thine
Who wrench'd their rights from thee!

What wonder if in noble heat
Those men thine arms withstood,
Retaught the lesson thou hadst taught,
And in thy spirit with thee fought—
Who sprang from English blood!

But thou rejoice with liberal joy,
Lift up thy rocky face,
And shatter, when the storms are black,
In many a streaming torrent back,
The seas that rock thy base!

Whatever harmonies of law
The growing world assume,
Thy work is thine—the single note
From that deep chord which Hampden smote
Will vibrate to the doom.

ULYSSES

One of the most interesting of all the legends of ancient Greece is that which tells of the wanderings of Ulysses. It is briefly given in the STORY OF FAMOUS BOOKS, on page 74, and it might be well to read that together with this fine poem by Lord Tennyson. The poet is not here concerned with the adventures of Ulysses, or, indeed, with the hero of old Greece, except as a means to express the restless spirit. For his song is really in praise of the man who cannot sit idle by his cosy hearth, but must roam abroad on new quests, and even in old age retains the keen scent of youth for adventure and fresh experience, being prepared equally for great pleasures and for suffering. It is only those who have suffered most that have most enjoyed.

IT little profits that an idle king,
By this still hearth, among these barren crags,
Match'd with an aged wife, I mete and dole
Unequal laws unto a savage race,
That hoard, and sleep, and feed, and know not me.
I cannot rest from travel; I will drink
Life to the lees: all times I have enjoy'd
Greatly, have suffer'd greatly, both with those
That lov'd me, and alone; on shore, and when.
Thro' scudding drifts the rainy Hyades
Vext the dim sea: I am become a name;
For always roaming with a hungry heart
Much have I seen and known: cities of men
And manners, climates, councils, governments,
Myself not least, but honour'd of them all;
And drunk delight of battle with my peers,
Far on the ringing plains of windy Troy.
I am a part of all that I have met;
Yet all experience is an arch wherethro'
Gleams that untravell'd world, whose margin fades
For ever and for ever when I move.
How dull it is to pause, to make an end,
To rust, unburnish'd, not to shine in use!
As tho' to breathe were life. Life piled on life
Were all too little, and of one to me
Little remains; but every hour is saved
From that eternal silence, something more,
A bringer of new things; and vile it were
For some three suns to store and hoard myself,
And this grey spirit yearning in desire
To follow knowledge like a shining star,
Beyond the utmost bound of human thought.
This is my son, mine own Telemachus,
To whom I leave the sceptre and the isle—
Well loved of me, discerning to fulfil
This labour, by slow prudence to make mild
A rugged people, and thro' soft degrees
Subdue them to the useful and the good.
Most blameless is he, centred in the sphere
Of common duties, decent not to fail
In offices of tenderness, and pay
Meet adoration to my household gods,
When I am gone. He works his work. I mine.
There lies the port: the vessel puffs her sail:
There gloom the dark broad seas. My mariners,
Souls that have toil'd, and wrought, and thought with me—
That ever with a frolic welcome took
The thunder and the sunshine, and opposed
Free hearts, free foreheads—you and I are old;
Old age hath yet his honour and his toil;
Death closes all: but something ere the end,
Some work of noble note, may yet be done,
Not unbecoming men that strove with gods.
The lights begin to twinkle from the rocks:
The long day wanes, the slow moon climbs, the deep
Moans round with many voices. Come, my friends,
'Tis not too late to seek a newer world.
Push off, and sitting well in order smite
The sounding furrows; for my purpose holds
To sail beyond the sunset, and the baths
Of all the western stars, until I die.
It may be that the gulfs will wash us down;
It may be we shall touch the Happy Isles,
And see the great Achilles, whom we knew.
Tho' much is taken, much abides; and tho'
We are not now that strength which in old days
Moved earth and heaven; that which we are, we are;
One equal temper of heroic hearts,
Made weak by time and fate, but strong in will
To strive, to seek, to find, and not to yield.

THE ISLE OF LONG AGO

Benjamin Franklin Taylor was one of the lesser-known American poets. He lived from 1819 to 1887, and wrote many pleasant verses and much good prose. The following, if somewhat sentimental, is still tuneful and tender, and may be given as a good example of his once popular poems.

OH, a wonderful stream is the river of Time,
As it runs through the realm of Tears,
With a faultless rhythm and a musical rhyme,
And a boundless sweep and a surge sublime,
As it blends with the ocean of Years.

How the winters are drifting, like flakes of snow,
And the summers, like buds between;
And the year in the sheaf—so they come and they go,
On the river's breast, with its ebb and flow,
As it glides in the shadow and sheen.

There's a magical isle up the river of Time,
Where the softest of airs are playing;
There's a cloudless sky and a tropical clime,
And a song as sweet as a vesper chime,
And the Junes with the roses are staying.

And the name of that Isle is the Long Ago,
And we bury our treasure there;
There are brows of beauty and bosoms of snow—
There are heaps of dust—but we loved them so!—
There are trinkets and tresses of hair.

There are fragments of song that nobody sings,
And a part of an infant's prayer,
There's a lute unswept, and a harp without strings;
There are broken vows and pieces of rings,
And the garments that she used to wear.

There are hands that are waved, when the fairy shore
By the mirage is lifted in air;
And we sometimes hear, through the turbulent roar,
Sweet voices we heard in the days gone before,
When the wind down the river is fair.

Oh, remembered for aye be the blessed Isle,
All the day of our life till night—
When the evening comes with its beautiful smile,
And our eyes are closing to slumber awhile,
May that "Greenwood" of Soul be in sight.

THE PATRIOT

The first line of this poem by Robert Browning is one which is often quoted. The poem was written to illustrate the fickleness of popular applause. History abounds in examples of men who have been hailed as heroes by the mob and a little later have been hounded to death by the same mob. The wise man is he who has the strength to look with contempt upon the favor of the crowd, knowing that they who acclaim him a patriot or a hero would as readily, if it served their purpose, denounce him as a traitor or a humbug. The finest illustration of how the opinion of the ignorant mob can change is to be found in Shakespeare's play of "Julius Cæsar," by noting how the same people who applaud Brutus turn round and applaud his enemy, and their own worst friend, Antony.

IT was roses, roses, all the way,
With myrtle mixed in my path like mad;
The house-roofs seemed to heave and sway,
The church-spires flamed, such flags they had
A year ago on this very day.

The air broke into a mist with bells,
The old walls rocked with the crowd and cries.
Had I said, "Good folk, mere noise repels;
But give me your sun from yonder skies!"
They had answered, "And afterward, what else?"

Alack, it was I who leaped at the sun
To give it my loving friends to keep!
Naught man could do have I left undone:
And you see my harvest, what I reap
This very day, now a year is run.

There's nobody on the house-tops now—
Just a palsied few at the windows set;
For the best of the sight is, all allow,
At the Shambles' Gate; or, better yet,
By the very scaffold's foot, I trow.

I go in the rain, and, more than needs,
A rope cuts both my wrists behind;
And I think, by the feel, my forehead bleeds,
For they fling, whoever has a mind,
Stones at me for my year's misdeeds.

Thus I entered, and thus I go!
In triumphs, people have dropped down dead.
"Paid by the world, what dost thou owe
Me?"—God might question; now, instead,
'Tis God shall repay: I am safer so.

THE DEATH OF THE FLOWERS

It is perhaps pleasanter to sing of the coming of the flower-time and the radiant days of summer than of the waning season, when the flowers are disappearing before the chilling breath of winter. But all seasons have their beauty, and there have probably been as many poems in praise of winter as in praise of spring. There is beauty even in certain forms of sorrow, and it is the poet's part to express this beauty for us. In the following poem by William Cullen Bryant, our famous American writer, a close observer of Nature, this pale beauty of regret is finely conveyed.

THE melancholy days are come, the saddest of the year,
Of wailing winds, and naked woods, and meadows brown and sere.
Heap'd in the hollows of the grove, the autumn leaves lie dead;
They rustle to the eddying gust, and to the rabbit's tread.
The robin and the wren are flown, and from the shrubs the jay,
And from the wood-top calls the crow through all the gloomy day.

Where are the flowers, the fair young flowers, that lately sprang and stood
In brighter light and softer airs, a beauteous sisterhood?
Alas! they all are in their graves; the gentle race of flowers
Are lying in their lowly beds with the fair and good of ours.
The rain is falling where they lie; but the cold November rain
Calls not from out the gloomy earth the lovely ones again.

The wind-flower and the violet, they perish'd long ago,
And the brier-rose and the orchis died amid the summer glow;
But on the hill the golden-rod, and the aster in the wood,
And the yellow sunflower by the brook, in autumn beauty stood
Till fell the frost from the clear, cold heaven, as falls the plague on men,
And the brightness of their smile was gone from upland, glade, and glen.

And now, when comes the calm, mild day, as still such days will come,
To call the squirrel and the bee from out their winter home;
When the sound of dropping nuts is heard, though all the trees are still,
And twinkle in the smoky light the waters of the rill,
The south wind searches for the flowers whose fragrance late he bore,
And sighs to find them in the wood and by the stream no more.

And then I think of one who in her youthful beauty died,
The fair, meek blossom that grew up and faded by my side.
In the cold, moist earth we laid her when the forest cast the leaf,
And we wept that one so lovely should have a life so brief;
Yet not unmeet it was that one, like that young friend of ours,
So gentle and so beautiful, should perish with the flowers.

ON THE GRASSHOPPER AND CRICKET

What we have written on the "Death of the Flowers" is curiously confirmed in this little poem by John Keats one of the great English poets, of whom we read in this book.

THE poetry of earth is never dead:
When all the birds are faint with the hot sun
And hide in cooling trees, a voice will run
From hedge to hedge about the new-mown mead.

That is the Grasshopper's—he takes the lead
In summer luxury—he has never done
With his delights; for, when tired out with fun,
He rests at ease beneath some pleasant weed.

The poetry of earth is ceasing never:
On a lone winter evening, when the frost
Has wrought a silence, from the stove there shrills
The Cricket's song, in warmth increasing ever,
And seems, to one in drowsiness half lost,
The Grasshopper's among some grassy hills.

LITTLE VERSES FOR VERY LITTLE PEOPLE

IF all the world were apple pie,
And all the sea were ink,
And all the trees were bread and cheese,
What should we have to drink?

HERE we go up, up, up,
And here we go down, down, downy;
And here we go backwards and forwards,
And here we go round, round, roundy.

MILLIONS of massive raindrops
Have fallen all around;
They have danced on the house-tops,
They have hidden in the ground.

They were liquid-like musicians
With anything for keys,
Beating tunes upon the windows,
Keeping time upon the trees.

BLOW, wind, blow! and go, mill, go!
That the miller may grind his corn;
That the baker may take it, and into rolls make it,
And send us some hot in the morn.

NOW, all of you, give heed unto
The tale I now relate,
About two girls and one small boy,
A cat, and a green gate.

Alack! Since I began to speak—
And what I say is true—
It's all gone out of my poor head,
And so, good-bye to you.

EVERY lady in this land
Has five nails upon each hand,
Twenty on her hands and feet.
All this is true, without deceit.

THERE was an old woman who had three sons,
Jerry and James and John;
Jerry was hung, James was drowned,
John was lost, and never was found;
And there was an end of her three sons,
Jerry and James and John!

"IS John Smith within?"
"Yes, that is he."
"Can he set a shoe?"
"Ay, marry, two,
Here a nail, there a nail,
Tick, tack, too."

I SAW a ship a-sailing
A-sailing on the sea;
And oh, it was all laden
With pretty things for thee!

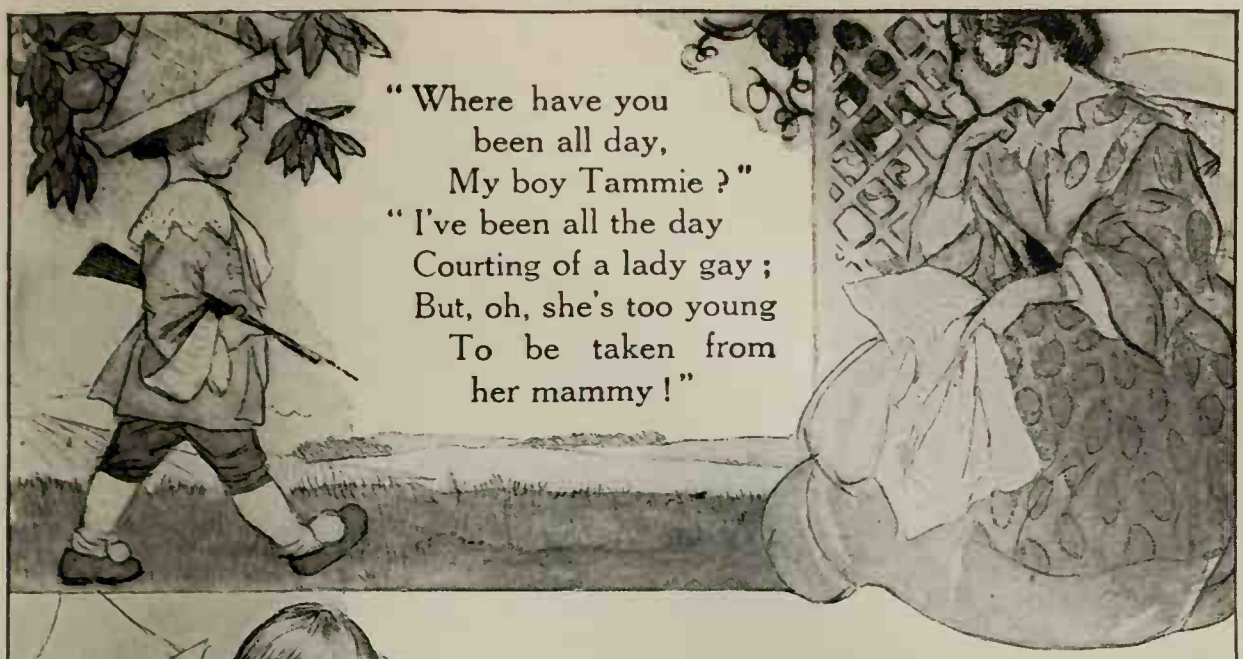
There were comfits in the cabin,
And apples in the hold;
The sails were made of silk,
And the masts were made of gold.

The four-and-twenty sailors
That stood between the decks,
Were four-and-twenty white mice,
With chains about their necks.

The captain was a duck,
With a packet on his back,
And when the ship began to move,
The captain said, "Quack, quack!"

HEY, my kitten, my kitten,
And hey, my kitten, my deary;
Such a sweet pet as this
Was neither fat nor weary.

WHERE HAVE YOU BEEN MY BOY TAMMIE?



"Where have you
been all day,
My boy Tammie?"
"I've been all the day
Courting of a lady gay;
But, oh, she's too young
To be taken from
her mammy!"

"What work can she do,
My boy Tammie?
Can she bake and can she brew,
My boy Tammie?"

"She can brew and she can bake,
And she can make our wedding cake;
But, oh, she's too young
To be taken from her mammy!"

"What age may she be—
What age may she be,
My boy Tammie?"

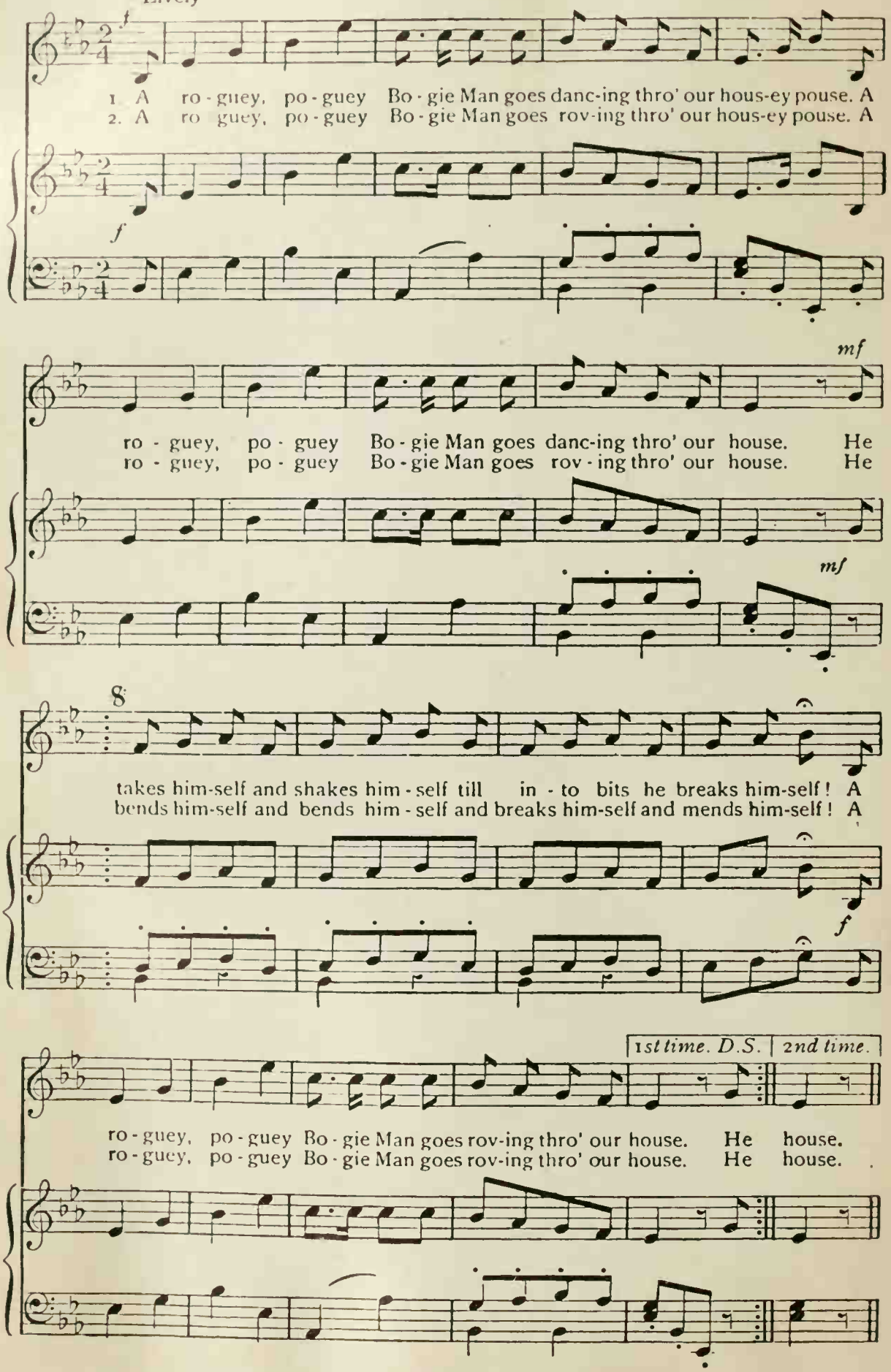
"Twice two, twice seven,
Twice ten, twice eleven;
But, oh, she's too young
To be taken from her mammy!"

THE BOGIE MAN

Words by ALFRED P GRAVES

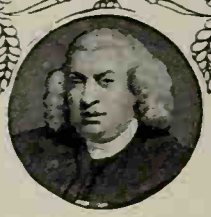
Music by permission of MESSRS. SCHOTT & Co.

Lively


f
1. A ro - guey, po - guey Bo - gie Man goes danc-ing thro' our hous-ey pouse. A
2. A ro - guey, po - guey Bo - gie Man goes rov-ing thro' our hous-ey pouse. A
f
mf
ro - guey, po - guey Bo - gie Man goes danc-ing thro' our house. He
ro - guey, po - guey Bo - gie Man goes rov - ing thro' our house. He
mf
8
takes him-self and shakes him - self till in - to bits he breaks him-self! A
bends him-self and bends him - self and breaks him-self and mends him-self! A
f
1st time. D.S. | 2nd time.
ro - guey, po - guey Bo - gie Man goes rov-ing thro' our house. He house.
ro - guey, po - guey Bo - gie Man goes rov-ing thro' our house. He house.

SOME GREAT ENGLISH WRITERS

CONTINUED FROM 4634



DR. JOHNSON

ELSEWHERE in this book we may read the life-stories of the famous English poets and novelists, and we are now to learn about the lives of other writers who were distinguished for achievements of different kinds. In what is known as "the essay," or the writing of short and pleasing discourses on almost any sort of subject, there are two names which always come uppermost when we think of the English authors who have excelled in this form of literature. Addison and Steele were friends and fellow-workers during a great part of their lives, though unhappily they quarreled at the end.

It would be difficult to find two men more unlike each other, and it was perhaps just because they were so different that they so long succeeded in working together, as people seem most ready to admire in their friends the qualities they themselves do not possess. Certainly it was due to Addison and Steele that a considerable amount of delightful work was added to English literature. They were by no means the originators of the essay, as a hundred years before them the great English statesman and scholar, Sir Francis Bacon, afterwards Lord Verulam, had written many essays which are justly considered among the classic treasures of our language. Bacon lived in the great age of Shakespeare, when the English tongue had just changed from its older form into what we call "modern English," but it still retained some quaint words and curious phrases of the old-fashioned speech. But by the end of the seventeenth century, when Addison and Steele flourished, it had shaped itself very closely to the educated speech of our own time, though many words were still pronounced differently, as indeed the language is constantly changing, enriching itself with new words to express new ideas and changing old words into new meanings.

The seventeenth century, and more particularly the eighteenth were periods of history in which the English people were more formal and pompous in their manners than they are to-day, with the result that their written speech took on a certain stiffness and strove always to be "elegant," just as though a person were always dressed up for some ceremony, and never knew the delight of taking one's ease in old clothes. We can see this as we read the essays of Addison and Steele. They are full of stately phrases, and courtly compliments and bows. Their writers are always

bent on showing us how well-bred are their manners. There is just a suspicion that they are looking in their mirrors, and are much pleased with themselves. They wrote long before the days of the modern newspaper, whose purpose is to chronicle the events of the fleeting hour, to record the history of the world from day to day. People were not in a hurry then; telegraphs, telephones, and railway trains were still undiscovered secrets.

THE FAMOUS JOURNALS IN WHICH THE GREAT ESSAYISTS WROTE

But Addison and Steele set themselves to entertain and instruct their countrymen by writing on all sorts of subjects, and printing their essays in periodical form. Thus "The Tatler," first issued on April 12, 1709, was quite a tiny sheet, published three times a week at one penny. In all, two hundred and seventy-one numbers appeared, of which Steele wrote one hundred and eighty-eight, while Addison wrote only about forty, but joined with Steele in writing about thirty-five of the issues. The remainder were from other pens. A feature of "The Tatler" had been an imaginary club of gentlemen known as "The Spectator Club"; and two months after "The Tatler" came to an end, "The Spectator" on very similar lines, was started as a daily paper, Addison writing no less than two hundred and seventy-four numbers. "The Spectator" ceased on December 6, 1712, after five hundred and fifty-five numbers had appeared; but two years later it was resumed again, and eighty more numbers of the famous paper were published.

HOW ADDISON AND STEELE SPOKE TO THE PEOPLE OF THEIR DAY

It is very difficult for us to-day to realize how much the writings of these men in the papers mentioned affected the life of their time. This was really the first great triumph of the printing-press. None of the famous novelists who afterwards arose to enthral the public with their stories had yet given evidence of their powers. Books were by no means numerous, newspapers were still in their infancy; but here, in those little printed sheets, were men of great intelligence speaking to their fellow-countrymen every day, writing them letters, as it were, full of wisdom and wit and shrewd observation. They were, in a sense, great preachers, and these little papers were their pulpits, from which they addressed immensely greater congregations than ever any preacher could reach with the spoken word. And to-day the essays in "The Spectator" and "The Tatler" are still read, and influence the thoughts of their readers two centuries after they were written.

Joseph Addison was born on May 1, 1672, the son of a poor clergyman who afterwards became Dean of Lichfield. Both he and Steele were scholars together at the famous Charterhouse School in London. Addison afterwards distinguished himself at Oxford, and had the luck to write some verses in praise of the king, which secured him a pension of $1,500 a year, and enabled him to travel on the Continent to go on with his education. But when King William died, the poet lost his pension, and knew the pinch of poverty for a time; until, with an eye to further profit, he wrote another poem celebrating the victory of Blenheim and praising the great military hero Marlborough.

THE END OF JOSEPH ADDISON'S HONORED AND USEFUL LIFE

This was more than generously rewarded by the gift of an official appointment, whence he rose to be one of the principal secretaries of state. Those were the days when the two great political parties were known as Whigs and Tories. Addison supported the former, and devoted his pen to their service; and if he made good profit out of his politics, receiving a splendid pension when he retired, a year before his death, we need grudge him nothing that he earned, as his services to literature were far beyond the rewards of mere money.

Like many other famous men it is said that he was not happy in his marriage. His wife was the Dowager Countess of Warwick, and in the later years of his life his happiest days were spent in meeting his old friends at a London tavern. He was only forty-seven when he died, on June 17, 1719, and on his death-bed he said to his step-son: "See how a Christian can die."

His friend, Richard Steele, was a rollicking Irishman, born, it is said, on March 12, 1672, though some authorities maintain that he was three years younger

THREE MASTERS OF ENGLISH PROSE

Joseph Addison and Richard Steele were two great friends who lived and wrote in the days of Queen Anne. They founded two papers, called "The Tatler," and "The Spectator," which they filled with clever essays on all sorts of subjects. Steele was devoted to his friend, who often dictated his essays to him, as we see here.

Edward Gibbon was the author of one of the greatest histories that have ever been written. When on a visit to Rome, he was sitting one evening in a church that had once been an ancient temple, standing high on the Capitol Hill, and some barefooted friars were singing the vespers, as we see here. Suddenly, as he sat thinking, there flashed into his mind the idea of telling the story of how the tremendous temples and palaces of this wondrous city fell into decay, and "The Decline and Fall of the Roman Empire" was the result.

than Addison. Thackeray says of him: "I am afraid no good report could be given by his masters and ushers of that thick-set, square-faced, black-eyed, soft-hearted little Irish boy. He was whipped deservedly a great number of times. Though he had very good parts of his own, he got other boys to do his lessons for him, and only took just as much trouble as should enable him to scuffle through his exercises, and by good fortune escape the flogging-block."

THE UPS AND DOWNS OF RICHARD STEELE, THE FRIEND OF ADDISON

He went to Oxford, but left the university without taking a degree and went into the army as a trooper. By taking this step he lost an estate which his uncle refused to leave him. His colonel, however, found out his capacity, made him his secretary, and got him a commission. By and by, he wrote a book "The Christian Hero," at which his fellow-officers laughed, but which attracted the attention of King William III. Then he tried his hand at writing for the stage; but he soon abandoned dramatic authorship, and we next hear of him, in 1706, as gentleman-waiter to Prince George of Denmark. His affairs prospered for a time, and from 1709 onwards he was pouring out those brilliant essays for "The Tatler." He became a Member of Parliament, but was expelled for writing in favor of the house of Hanover. On the death of Queen Anne, however, when the Hanoverian King George I. came to the throne, he was rewarded with an official post. But he was by nature improvident and careless, and was always in difficulties. Toward the end of his life he fell ill. He was no longer able to work, so he left London and went to live near Carmarthen in Wales, where he died in September 1729.

DR. SAMUEL JOHNSON, THE SON OF A HUMBLE BOOKSELLER

We turn now to one of the greatest figures in all literary history, though, strangely enough, his achievements in authorship are comparatively small. Doctor Samuel Johnson ranks among the immortals more by reason of his strong and picturesque personality than because of his literary achievements. His father was a bookseller at Lichfield, where Samuel was born on September 18, 1709. He was a heavily-built, ungainly youth, lazy and untidy, disinclined for boyish pursuits, and interested only in the contents of his father's shop. He was taken from school when he was sixteen, and stayed at home for two years, devouring every book that came into his hands. He went to Oxford University in 1729, but his father's business had become poor, and he was obliged to leave within three years without taking a degree.

His father died soon afterwards, and the great lumbering fellow tried to earn his living as a teacher in a grammar-school, but did not succeed. But, in spite of all his failures, there was probably no one of his years who had read so much or had a better title to be called a "scholar." His knowledge was universal, and he declared that there was no book that was not worth reading for the sake of some fragment of knowledge that it added to one's store.

At that time publishing was a very different business from what it is to-day. It was then the custom for a number of booksellers to combine, and to get an author to write or translate a book for them, which they sold in their own shops.

THE HARDSHIPS OF DR. JOHNSON'S EARLY LIFE AS AN AUTHOR IN LONDON

In 1733 Johnson went to Birmingham, where he did translating for booksellers, and also wrote for a provincial paper. In that town, two years later, he married a widow twenty years older than he. With some money which he got from her, he set up a school near Lichfield, where, at the end of eighteen months, he had succeeded in getting three pupils.

He was thus a failure as a schoolmaster, just as he had been as an assistant. But there was no gainsaying the richly-stored mind of the man. He had something greater than mere routine success. In the ample leisure of his teaching he had written a tragedy, "Irene," and one day, in 1737, with this in his pocket, he set out for London with one of these three pupils, a brisk young man of twenty, who was going to study for the Bar, but who very soon became London's greatest actor, David Garrick.

In the great city Johnson had to turn his pen to many uses, and knew the bitterness of writing much for little pay. He was a literary hack. He wrote for a publisher named Cave, who issued "The

Gentleman's Magazine," in which Johnson used to write every month an account of the debates in Parliament from information received at second-hand. He translated; he wrote poems, one a long satire, entitled "London," for which, though a success when published, he received only about fifty dollars. Meanwhile, Garrick had come to the front as an actor, and he produced his old master's tragedy, "Irene," for which he paid $1,500, though the play was not a success.

DR. JOHNSON'S GREAT DICTIONARY OF THE ENGLISH LANGUAGE

Then, in 1747, for a group of booksellers, Johnson began his famous "Dictionary of the English Language," which took him seven years to complete, and on which he employed many assistants. While it was still proceeding, he published twice weekly for a time an essay-journal like "The Spectator," called "The Rambler," and later he ran for two years a similar publication, "The Idler." In these some of his most characteristic work appears.

Although his wife was so much older than he and was quite without literary taste or culture, they had lived very happily together, and her death, in 1752, was a deep and abiding sorrow to him. But he toiled away at his work with an energy no one who knew him as a youth would have expected—an energy, we cannot but think, that came chiefly from the need to earn his bread. When his mother died, in 1759, he wrote a fanciful story entitled "Rasselas," the payment for which he designed to meet the expenses of his mother's funeral. It is so good a piece of literature that it is probably more read to-day than anything else of his; and it met with immediate success. Johnson received $500 for it, and a further sum of $125 when it went into a second edition.

JAMES BOSWELL, WHO WROTE THE FAMOUS "LIFE" OF DR. JOHNSON

In the year 1762 the scholarly attainments of Johnson and his literary services were very generously recognized by the king granting him a pension of $1,500 per annum. He lived for twenty-two years more, and during that time did very little work, beyond writing his "Lives of the Poets," in which his wide reading and literary knowledge are seen to great advantage, if his opinions are not always to be accepted.

It was in 1763 that he became friends with James Boswell, a Scottish advocate and man of letters. Although he had many friends far more notable than Boswell, and was the founder of a literary club whose membership included such illustrious names as those of Burke, Goldsmith, Gibbon, Reynolds, and Garrick, it is to Boswell that no small share of the fame which the name of Johnson enjoys in literary history is due. For, after Johnson's death, which occurred on December 13, 1784, Boswell wrote a great "Life" of the friend whom he admired so much, and so well did he compile his materials that it may be described as the finest book of its kind in the world. Indeed, Boswell's "Life of Johnson" has probably been more read than any of Johnson's own writings.

Boswell had the good sense to realize how rare and great a man was this ungainly, snuffy old fellow, who loved to sit in tavern chairs and discourse on life and literature, often advancing his opinions with much rudeness to others present, but more often uttering things worthy to be remembered. So the fussy Scotsman very diligently made notes of Johnson's sayings, and these he set forth with great skill and effect in his famous biography. The grave of Dr. Johnson is in Westminster Abbey.

DAVID HUME, THE LEARNED HISTORIAN AND PHILOSOPHER

David Hume, famous as a historian and philosopher, is the next great English writer who calls for attention. It is true that he was a Scotsman, but as he wrote in the English language he was an English man of letters, and must, of course, be included here. Hume's proper name was Home. He came of a distinguished family, but chose thus to alter his name. He was born in Edinburgh on April 26, 1711, and studied at the university there. It was originally intended that he should be a lawyer, but he preferred literature to law, and though later on he engaged in commerce for a time at Bristol, he was clearly unsuited for it. A stay in France from his twenty-third to his twenty-sixth year had much to do with directing his mind towards the serious questions of life and thought. But his first book was a failure, and his second only a moderate success. They were, of course, on subjects no young

person would trouble his head about, and showed a great deal of knowledge; but, for all that, Edinburgh University did not make him a professor, as he would have liked, in 1745.

The next few years he spent first as companion to a young nobleman, and later as secretary to a general officer. In this way he was able to travel a good deal, and he seems to have been so careful with his money that he gathered together five thousand dollars, which he considered quite a fortune!

How Hume Achieved Success After Failure and Disappointment

Failing to secure the Edinburgh professorship, he did not despise the position of librarian to the Advocates' Library, Edinburgh. If the salary was small, the duties were not heavy, and he had at his command a splendid collection of books of reference for his own use. It was while so employed that he began his great "History of England."

The first published volume did not succeed as well as Hume expected. His disappointment was intense, but in due course the succeeding volumes appeared, and as England had but recently emerged from her successful struggle with France, capturing the rich prize of Canada, readers were more alive to the interest of history, and Hume's work came into favor. When it was completed he was famous. It would be difficult to give a better instance of how failure may be converted into triumph by a man simply doing the best of which he is capable.

In France, as well as in England and his native Scotland, Hume now enjoyed a great reputation, and held an important Government post for a time. A good-natured, simple, unaffected man, David Hume had many friends, and the beautiful clearness of his literary style, together with the attention given to the life and actions of the people as well as to their rulers, made his historical writings interesting and valuable. He died on August 25, 1776.

Edward Gibbon, Who Wrote the Finest History Book in the World

During the year in which David Hume died, the first volume of the greatest historical work written in the English language was published; and the dying historian was able to praise the younger man who was achieving even greater things than he himself had accomplished. Edward Gibbon was the name of the new historian; his work, "The Decline and Fall of the Roman Empire." Despite all the histories that have been written during the last century and a half, this great work remains, and is likely long to stand the masterpiece of its class.

Gibbon, who was rather a queer sort of boy, was born at Putney, now a part of London, but then a rural village, on May 8, 1737. His father was a country gentleman. His mother died when he was young. So an aunt undertook the care of the strange, nervous little boy, whose head seemed almost too big for his body. He was sent to Westminster School when twelve years old. There for two years he led a very unhappy life. About two years later, he went to Oxford, where he was noted more for the out-of-the-way nature of the knowledge he had acquired by his ill-ordered reading at home and school, and his ignorance of the commonest affairs, than for any student-like qualities.

Gibbon's Life by the Blue Waters of Lake Geneva

Gibbon was only seventeen when his father decided to send him abroad, not only for the sake of his education, but in order to change his religious views. The youth at Oxford had been inclined to the Roman Catholic Church, so his father chose to place him under a Protestant pastor at the beautiful town of Lausanne, on the Lake of Geneva. There, owing to the influence and teaching of the pastor, the young man returned to the Protestant faith, to which he ever after adhered.

For five years he continued to live by the blue waters of the famous lake, in the household of the French pastor, during which time he carried on such studies in French and Latin literature that stored his mind, thanks to his wonderful memory, with historical knowledge unequaled by any other of his age. It was during these early days in Lausanne—for to the end of his life Gibbon was fated to have association with that town—that the only romance of his quiet and bookish life took place. He was about twenty years of age, a small-boned and very thin youth at the time. The young lady was Mademoiselle Suzanne Curchod, and she was the daughter of a poor village pastor living in Burgundy. She was clever, but natural; refined, but not priggish;

THE MAN WHO WROTE A GREAT DICTIONARY

Before the days of cheap printing, and when books found few readers, the poorer authors used to seek the patronage of rich and influential men. In this picture we see Dr. Samuel Johnson waiting in the ante-chamber of Lord Chesterfield's house. Dr. Johnson was disappointed in his hope of receiving help from the peer, but pushed on with his work in spite of all difficulties. He compiled the first large English dictionary.

Dr. Johnson lived and worked in London, in the centre of the district in which the great newspapers and books are now printed. He had many friends whose names are famous in literature and art—Burke, Gibbon, Reynolds, and Garrick among them. He used to meet his friends in the coffee-taverns of Fleet Street, and in this picture we see him in the Mitre Tavern, with Boswell on his right and Oliver Goldsmith facing him.

Gibbon found her everything that he considered a woman should be. He made visits to her father's house in Burgundy, and saw the young lady there in the charming atmosphere of a very poor, but very refined, home circle. His heart told him that here was his hope of earthly happiness. But on a visit home he learned that his father would not hear of such a match.

"Without his consent," says Gibbon, "I was myself destitute and helpless. I sighed as a lover; I obeyed as a son."

It is a strange fact that these two young people, who met in early life, and cared for each other when they were both poor, humble, and obscure, should both live to become famous. But so it happened. It was at Lausanne, where he had first met the charming daughter of the poor pastor, that Gibbon concluded his immortal history, and became one of the first men in Europe.

THE FAMOUS WOMAN WHO MIGHT HAVE BEEN THE WIFE OF A FAMOUS MAN

On the death of her father, Suzanne Curchod, left penniless, retired to Geneva, and there kept body and soul together for herself and her mother by teaching. It chanced that M. Necker, one of the richest bankers in Paris, came on a visit to his native city, and there fell in love with the humble and beautiful governess. He married her, and took her to Paris. M. Necker became one of the greatest statesmen in France, his wife became famous for her beauty and her goodness, and their daughter, Madame de Staël, attained world-wide celebrity, which continues to this day.

When touring in Italy in 1764–65, Gibbon sat musing amid the ruins of the Capitol of Rome, while some barefooted friars were singing vespers in a church that had once been the Temple of Jupiter. It was then that the idea of writing the most fascinating story in all history came to him, the decline and fall of the wonderful city among whose ancient ruins he was musing. But not until two years after his father's death, which took place in 1770, and put him in possession of a moderate fortune, did he begin the great task. He had then settled in London, where he was a friend of Dr. Johnson and a member of his literary club, and he succeeded Goldsmith as Professor of Ancient History at the Royal Academy. Gibbon was a member of Parliament for nine years, but retired in 1783. He then went back to Lausanne, and four years later had finished the work of his life on which his fame will rest secure.

THE END OF A GREAT TASK, AND THE WRITING OF AN IMMORTAL WORK

Gibbon never married. The romance of his boyhood lasted to the day of his death. But the writing of his great history was, perhaps, the true romance of his life. "It was on the day—or, rather, night—of June 27, 1787," he tells us, "between the hours of eleven and twelve, that I wrote the last page, in a summer-house in my garden. After laying down my pen, I took several turns in a *berceau*, or covered walk of acacias, which commands a prospect of the country, the lake, and the mountains. The air was temperate, the sky was serene, the silver orb of the moon was reflected from the waters, and all Nature was silent. I will not dissemble the first emotions of joy on recovering my freedom, and, perhaps, the establishment of my fame. But my pride was soon humbled, and a sober melancholy was spread over my mind, by the idea that I had taken an everlasting leave of an old and agreeable companion, and that whatsoever might be the future fate of my history, the life of the historian must be short and precarious."

Gibbon is described as a dutiful son, a tender, generous friend; and Lord Brougham said of him that "his honourable and amiable disposition, his kind and even temper, were praised by all."

GIBBON'S LAST DAYS, AND THE CHARACTER OF CHARLES LAMB

His great merit as a historian is the unique power of describing in glowing and stately phrases the most intricate masses of historical facts, so that they seem to pass before the mind's eye like a splendid and orderly pageant. Broken in health, Gibbon returned to London in 1793, and there died suddenly on January 16, 1794.

With the next famous author who steps forth to us from the past it is equally certain that his chief delights were found in books and writing. Ill-health, physical disadvantages, feeble nerves, and a dread of insanity were

the inheritance of Charles Lamb. And perhaps because all these disadvantages kept him confined to his study with his books, and forced him, in a sense, to the solace of literature, he has left to us a very precious legacy in the shape of the most charming essays in our language. Had we known him personally, with his stuttering speech, his moody and melancholy ways, we might not have taken to him so readily as we do in his written word, which reveals to us one of the gentlest and most lovable of characters.

THE BLUE-COAT BOY WHOM ALL THE WORLD LOVES

Lamb was a true Londoner, being born on February 10, 1775, in Crown Office Row, Inner Temple, the son of a lawyer's clerk; and a lover of London he remained to the last. Indeed, when we think of the many famous men of letters who have lived and died in London, and try to picture them as they walked its old streets and by-ways, the image of Charles Lamb comes as quickly to our mind as that of Doctor Johnson. His life, though uneventful in the main, was really a tragedy in which he quietly played the part of hero.

He was educated at Christ's Hospital, where, of course, he wore the long, ugly blue coat and loud yellow stockings of the "Blue-coat Boys," one of whom at that time was Samuel Coleridge, the future poet. At seventeen, Charles Lamb entered the service of the East India Company, in which quiet and well-paid employment he remained until 1825, when he retired on a liberal pension. He was thus spared the need to struggle for his living as so many literary men have had to do; his literary work was the pleasant occupation of his ample leisure.

THE TRAGEDY IN THE SAD LIVES OF CHARLES AND MARY LAMB

His battle was of another and more terrible nature. When he was twenty-one the great tragedy of his life occurred. There was insanity in his family, on his mother's side, and in 1796 his elder sister Mary, in a fit of madness, killed her mother. The poor young woman was for a time placed in a hospital, but on Charles giving a solemn undertaking to watch over and guard her through life, she was released when she was for a time restored to health. To this sacred trust he was true all the days of his life, giving up all thoughts of married happiness for himself.

In all the strange and beautiful stories of men and women, we doubt if there is anything more pathetic than that of Charles and Mary Lamb. For often again during her life was Mary visited with fits of mental illness. Both she and her brother knew when these were coming on. Charles would then take his sister by the hand, and lead her away to the hospital, where she would remain until the clouds that had gathered round her mind had cleared away again.

Despite this great sorrow, the gentle and beautiful characters of these two people were not without their times of happy reward. Often the two worked together in their literary pursuits; their "Tales from Shakespeare" and their "Poetry for Children" are among the memorials of these serener days of happy literary companionship. But the fame of Charles Lamb rests chiefly on his "Essays of Elia," so called from the name under which he wrote them, suggested to him by the actual name of a colleague in the East India House.

THE END OF CHARLES LAMB'S LIFE OF QUIET HEROISM

Lamb was a great writer of letters, and his friendships included most of the famous literary people of his time. No one has excelled him in the observation of everyday life, of the knowledge of human feelings; nor has any approached him in the quiet and gently humorous expression of his thoughts and fancies. The last years of his life were spent at Edmonton, near London. He died there on December 27, 1834, and was buried in Edmonton churchyard. He had been true all his life to his promise to watch over his sister. She survived him for thirteen years, but towards the end of her life she had to be kept under continual restraint. When at length her life of trial ceased, she was laid to rest by the side of her brother.

A friend of Charles Lamb, three years his junior, had died four years before him, Lamb being the only one of his old friends present at his funeral. This was William Hazlitt, the essayist and critic. Hazlitt was born at Maid-

stone, on April 10, 1778, the son of a Unitarian minister. He, too, was intended for the ministry, but gave up the idea, and tried his hand at portrait painting before he turned to literature. His first work, "Principles of Human Action," was published in 1805.

THE SAD LIFE OF WILLIAM HAZLITT, THE ESSAYIST AND CRITIC

He engaged in many different kinds of writing, and contributed to all sorts of journals and magazines, for the time had now come when periodical literature was greatly on the increase, and the field of the miscellaneous writer wide and varied.

Hazlitt is certainly among the foremost writers of our language, and in his essays we find him most often expressing, in perfect phrases, wise and illuminating thoughts on all sorts of subjects, though at other times he can contrive to be curiously heavy. His works have not the even beauty of Charles Lamb's, but his knowledge of literature was no less wide and deep, and where he fails it is chiefly due to his own character, which lacked the winning qualities that distinguished Charles Lamb.

Hazlitt's married life was unhappy, and for that he was himself much to blame. He quarreled with most of his friends, and his days came to an end in poverty and sorrow, when he died of cholera in London, on September 18, 1830.

THOMAS DE QUINCEY, THE STRANGE SON OF A WEALTHY MERCHANT

The next figure that attracts our notice as we look back upon these famous writers of the past is the strangest of all. The life of Thomas de Quincey would require quite a long book to give any proper idea of its eccentricity. His father was a wealthy Manchester merchant, and the boy was born in the great manufacturing town on August 15, 1785. His father died when Thomas was seven years old, and some years afterward his mother brought her family to Bath, and the boy attended the Bath Grammar School, where no scholar of his time was more alert of mind, and where he excelled in Latin verse. He afterwards went to school in Wiltshire, and traveled for a time in Ireland, before he was sent, in 1800, much against his will, to the Manchester Grammar School. Although only a boy in years, he seemed to have the intelligence of a grown man, and surprised all who met him by his knowledge. His mother now lived at Chester; and after eighteen months at the Manchester Grammar School he ran away, walking all the distance to his mother's house. He wanted no more schooling! Instead of going to college again, he received a small weekly allowance, and went wandering in Wales. His next move was to borrow money from friends and to make for London, where he had many adventures. Having severed connection with his family, he was at starving-point when they found him and brought him home.

When he was sent to Oxford University in 1803, his guardian allowed him only $500 a year; but as he was heir to a considerable fortune he found no difficulty in borrowing from money-lenders, and thus drew regularly from the bank of the future. His life at Oxford was quite eccentric; he paid no attention whatever to proper studies, but read just what he liked.

THE TERRIBLE HABIT THAT DARKENED DE QUINCEY'S LIFE

He had never been strong, and the privations of his life in London probably helped to bring on neuralgia, from which he suffered terribly while he was at Oxford. In the hope of relieving his pain, he commenced to take opium, and though he fought hard against it he never quite rid himself of the habit of taking this pernicious drug. He left the university in 1807, but not before he had visited London again and made many literary friends. Later, he became acquainted with Coleridge, and Lamb and Hazlitt were among his friends. While he was on a visit to Wordsworth and Southey at their homes in the Lake District, in 1809, he decided to settle there at Grasmere, and, gathering around him a fine library, began his literary work.

De Quincey wrote for many periodicals, but it was not until his "Confessions of an English Opium-Eater" were printed, in 1821, that his name became famous. He had been married now for five years, and as he had spent most of his money, he was compelled to support his family with his pen. The deep dejection which he suffered when the effects of opium were wearing off, and the struggles that he made to give up

CHARLES LAMB AND THOMAS DE QUINCEY

Charles and Mary Lamb were two of the gentlest and most beautiful characters who ever wrote English prose. They were poor, and a tragedy saddened Mary's life. Charles faced the world heroically and devoted his life to the care of his sister, and they wrote many beautiful stories, notably "Tales from Shakespeare."

This picture shows the strange, eccentric figure of Thomas de Quincey, shabbily dressed and in his slippers, walking through one of the old-fashioned streets of Edinburgh. A brilliant essayist and a witty talker, he led a curious life. He had a magnificent library, and, in addition, collected every paper and magazine he could. De Quincey wrote for periodicals. His most famous work is "The Confessions of an English Opium-Eater."

the habit of taking it, caused him much misery all his life, and took away much of the enjoyment that his work might have given him. He had a devoted wife, however, and a family of five sons and two daughters, so that, in spite of his suffering, he had a great deal of happiness in his life. Two of his sons afterwards gained some distinction as soldiers.

In 1828 De Quincey removed to Edinburgh, and for the remainder of his life lived there, with the exception of an occasional visit to Glasgow, where he might have been seen, the oddest of figures, a little shriveled man of five feet high, with a fine, intellectual head, shuffling along the streets dressed in worn and ill-fitting garments, with loose carpet slippers on his feet. His death took place at Edinburgh on December 8, 1859.

The last of the great writers with whom we are particularly concerned here is known to fame both as poet and historian. Thomas Babington Macaulay, though born at Rothley Temple, Leicestershire, on October 25, 1800, was of Scottish ancestry.

MACAULAY, THE CLEVER BOY WHO HATED MATHEMATICS

Like most of the others we have read about, he was an exceptionally clever boy, the one study he detested being mathematics. He passed from private schools to Cambridge University in 1818, and there carried off prizes for English verse and Latin oration. But, unlike many other celebrities, his college life was well-ordered, studious, and distinguished.

Macaulay was called to the Bar in 1826, but literature was his passion, and as he had made a name for himself the year before by an essay on Milton in "The Edinburgh Review," he made no effort to rise to a position at the Bar.

His great talents were now devoted to writing in "The Edinburgh Review," and his powers of oratory were seen to advantage in the House of Commons, where he became a distinguished member. His father, who had been a man of wealth, was so generous a giver to charities that he had almost impoverished his family; and chiefly for this reason Macaulay, at the age of thirty-four, accepted an important legal position in India with the splendid salary of $50,000 a year. But four years later he returned to England and again entered Parliament, and became Secretary for War. Many other important posts were later occupied by him, and no man's days can have been more packed with work, for he wrote continuously in addition to discharging his public duties.

THE WRITINGS THAT HAVE MADE LORD MACAULAY FAMOUS

His "Lays of Ancient Rome," in which he sang in swift and flowing verse some of the great deeds in Roman history, gave him world-wide popularity, while his collected essays were also read by everybody, and admired for the vigorous and direct style of the writing. His "History of England" had also an immense success, greater, perhaps, than any work of the kind had ever enjoyed. Yet as a historian he is least to be admired; for though his pages read well by reason of his splendid force of character, the swinging rhythm of his style, and the fine confidence of his statements, he was by no means careful of his facts, and sought effect rather than accuracy.

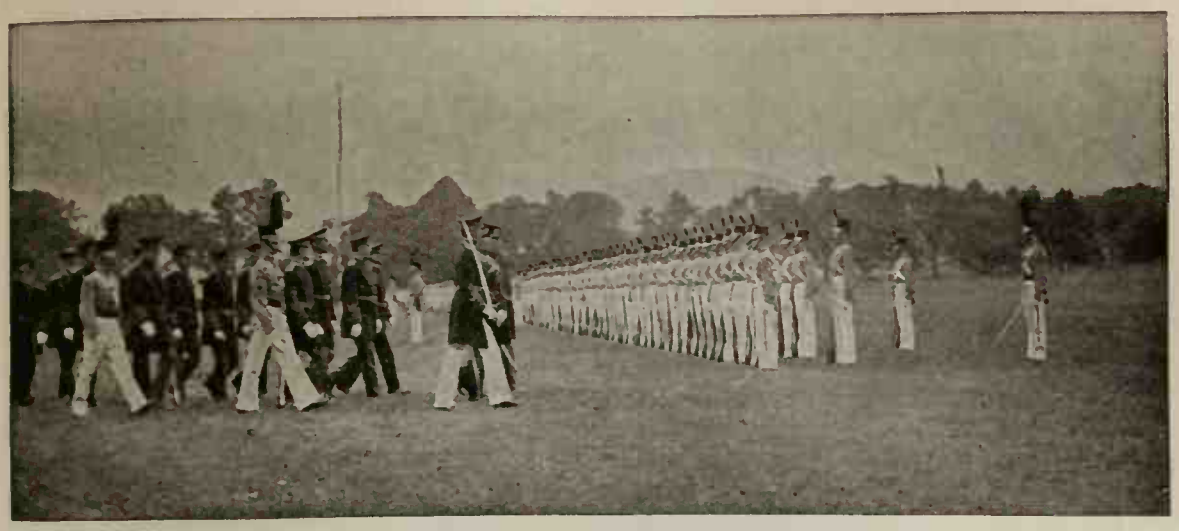
For all that, Lord Macaulay, who was raised to the Peerage in 1857, has a sure place among the great English writers. On December 28, 1859, he died in his armchair at Holly Lodge, Kensington, and was buried in Westminster Abbey.

In the story of these essayists, as they are called, and the lives of the great English poets and story-tellers of whom we may read in other parts of the book, we learn the story of the greatest of the English writers. In some other parts of this book certain figures appear who would equally have been in place here.

GREAT WRITERS WHO WERE ALSO GREAT THINKERS

Thus, Thomas Carlyle, philosopher and historian, Edmund Burke, philosopher and orator, John Ruskin, one of the leaders of modern thought, and others who may be regarded either as great writers or great thinkers, are to be found on other pages among the thinkers. English literature does not, of course, stop with these men; but it is too early yet to say how many of the later writers with whose work we are familiar to-day will be remembered by future generations.

THE NEXT MEN AND WOMEN BEGIN ON 4789.



Distinguished Visitors Inspecting the Cadet Battalion at West Point.

WEST POINT AND ANNAPOLIS

CONTINUED FROM 4675

YOU have all heard a great deal about generals and admirals and perhaps have read that some of them come from West Point and Annapolis. Possibly you have wondered what these places have to do with soldiers and sailors and have wished to know what and where they are, and what goes on there.

They are two towns, the first in New York, and the second in Maryland, and two famous government schools to train officers for the army and navy are situated in them. The United States Military Academy is at West Point, and the United States Naval Academy is at Annapolis. Few people ever use the whole name in speaking of either of these schools, but use instead, the name of the town where it is situated, and we shall follow their example, after telling a little about the settlement of West Point itself.

WEST POINT IMPORTANT IN REVOLUTIONARY TIMES

At the beginning of the Revolution, Congress decided to fortify the Hudson River, so that the British could not separate the New England States from the other states. Fifty miles above New York the river breaks through the Highlands in a winding gap, and on the right, or west bank, the land juts out in a point, and from this comes the name. Here Fort Arnold and other fortifications were built. It was these fortifications that Benedict Arnold wished to betray to the British, who could not take them by force. After Arnold's treason the name was changed to Fort Clinton.

When Washington became president, he wished to establish a training school for officers, but little was done. After Jefferson became president, ten cadets of engineers were appointed in 1802, and forty more the next year, but they did not get much attention. Not until 1812 was the school really put on a firm basis. Then two hundred and fifty cadets were appointed.

We cannot tell of all the gallant young graduates who won such glory in the Mexican War. Grant, Lee, Sherman, Hancock, Thomas, Meade, Stonewall Jackson, Albert Sidney Johnston, and Joseph E. Johnston, and many others who later won fame in the Civil War, were all graduates of West Point, and served first in the Mexican War, or in the Indian wars.

But we cannot stop to tell more of old West Point as there is so much to

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tell of the new. At the time of the Spanish War, the army was increased and it was seen that West Point must be enlarged. The best of the old buildings were kept, and many new ones were built. They make an imposing appearance as we go up from the river.

Let us see what the school is like. Under the present law there will be, when all are appointed, more than eleven hundred cadets. Two are appointed by each Member of the House of Representatives, two by each Senator, two are appointed from Hawaii, Alaska and Porto Rico, and four from the District of Columbia, and four from the Philippines. The President selects sixty, very often the sons of army or navy officers; twenty are appointed from the graduates of certain military schools, and one hundred and eighty from the regular army and the national guard together. Many of these young men are appointed by competitive examination.

No one can be admitted who is under seventeen or more than twenty-two years of age. He must be at least five feet, four inches tall, when seventeen, and five feet, five inches if older. He must have no disease or deformity, and must be strong and vigorous. His eyes, ears and teeth must be good, and he must not be color blind.

When a young man has received an appointment, he is ordered to report in June. If he passes the examination and is admitted, he becomes a "plebe." All summer he is drilled, first while living in the barracks and then in summer camp in tents. In September, all the cadets move back to the barracks, and regular recitations begin. The course lasts four years and is very hard. There is a great deal of mathematics, besides physics, engineering, science, French and Spanish, law, English and history and drawing. The cadet must study drill regulations, ordnance and gunnery, and other things which a soldier must know. He must go to the gymnasium, and must learn to swim and to ride. Every day is full of its duties, and yet no students have a better time than the West Point cadets.

The cost is all paid by the government. Every year $746 is credited to the young man, and the cost of everything he eats, wears and uses is charged to him. The cadets all eat together in the Mess Hall. At the end of two years, if his record is clear, a cadet has a vacation, or "furlough," for the summer, and may visit his home. The other summers are spent in camp, where there are no lessons from books, but much drill, riding and practical work in engineering is done during the summer encampment.

Everything is done under strict military discipline. Cadets always wear uniform, and march to the door of the recitation room, under charge of one of their number. In the room, the instructor, usually an army officer, has charge. Sections are small, never more than fifteen, and a student is called upon to recite nearly every day. No excuses are accepted for poor recitations, and marks are posted every week. A student is expected to spend about two hours in preparing his lesson in a hard subject, and if he fails in one of these subjects, he is either dropped from the Academy, or is turned back to the next class, losing a whole year.

Misconduct of any sort is not permitted. If a young man is not respectful to his officers, is late, or does not keep his uniform, his gun, or his room clean, he is punished by being given extra duty or by loss of privilege. If he is reported too often, he is suspended or dismissed.

So his life goes on through the four years. He learns many things. The cadets do everything that the regular army men do, and they are commanded by cadet officers. These officers are much envied, as they are chosen from the cadets of highest standing. The cadet is taught that no man is fit to command who has not learned to obey. He is taught how to study, and he gains an almost perfect body.

Then when he finally gets his diploma, he is commissioned a second lieutenant in the United States Army, and begins his work as a leader of men. Those who have the highest record for studies, and conduct, are allowed to choose the branch of the service they prefer, as engineers, artillery, cavalry or infantry. The men of highest rank usually choose the engineers, but not always. Wherever they go their standing in class helps them, for the men of high rank are promoted first.

WHERE THE OFFICERS OF THE NAVY ARE TRAINED

A hundred years ago boys who wished to become naval officers got appointments as midshipmen, if they could, and were

sent aboard one or another of the war vessels to carry messages for the officers. They were only boys, and no one looked after them very much unless they got into mischief. Then they were severely punished. Under these conditions a few became good sailors and officers, but the thoughtless and careless did not learn much.

Later, several schoolmasters were appointed to the ships, but sometimes the captains did not help, and there were many interruptions to the teaching. Some of the officers favored a real naval school, and Matthew F. Maury, a distinguished officer, wrote so much upon the subject, that he has been called the "Father of the Naval Academy." Finally the famous historian, George Bancroft, became Secretary of the Navy, and he determined to found a school to train officers.

Congress had not given any money for this purpose, but there was an abandoned fort at Annapolis, Maryland. The War Department turned over Fort Severn and nine acres of land to the Navy Department, and here, in October, 1845, the Naval School was opened with three instructors and fifty midshipmen. The course of study was to be five years, of which the first and fifth were to be spent at school and the other three on board ship. The name was changed to the United States Naval Academy in 1850, and the time spent at school became four years. Soon the old Constitution was given as a training ship.

At the beginning of the Civil War, it was feared that Annapolis was too far south to be safe, and the school was moved to Newport, Rhode Island, in 1861, and did not return to Annapolis until 1865.

After the Civil War the Navy of the United States was neglected, and little attention was paid to the Academy. There was not room for all the graduates, and they were encouraged to resign. When greater interest was taken in the navy, and many new vessels were built, more officers were needed, and after the Spanish War, magnificent new buildings were constructed. Now the Academy has better buildings than any other naval school in the world.

Much land has been bought since 1865, and the grounds are quite extensive. The principal buildings are all new. The largest is Bancroft Hall, where the midshipmen live, and on one side is Luce Hall, used as a gymnasium, and on the

The West Academic Building at West Point is one of the two in which most recitations are held. It was built in 1895, and is a successful example of fitting a new building into old surroundings. The East Academic is just opposite.

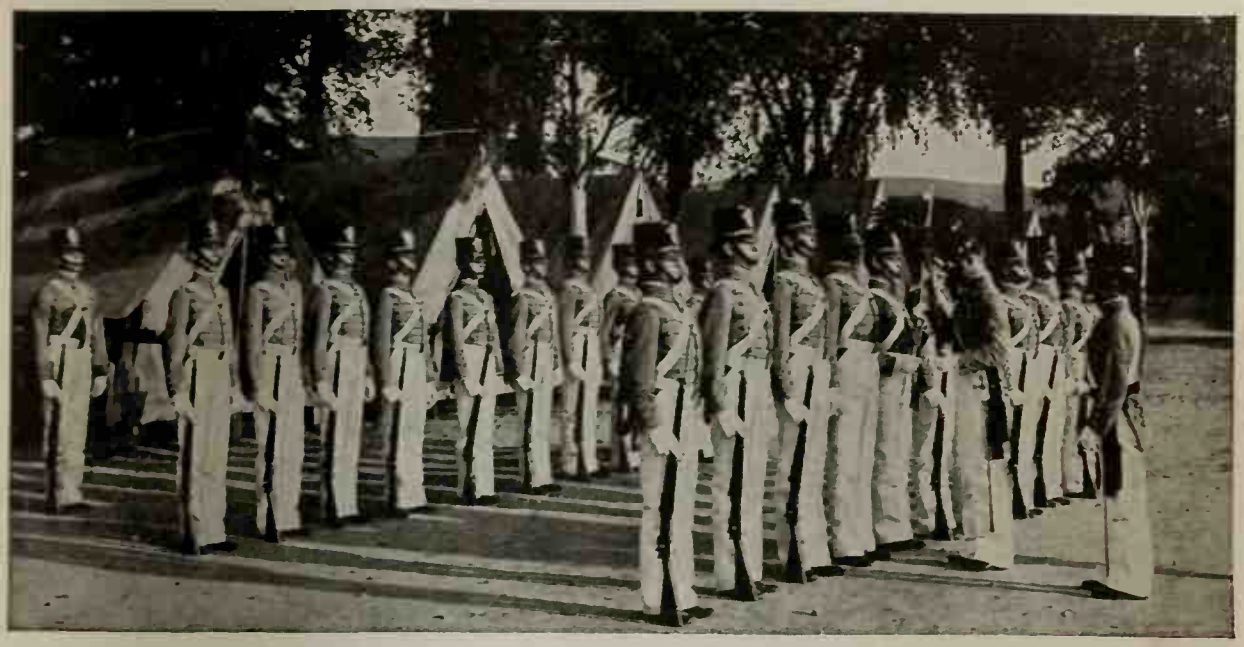
IN SIGHT OF THE BEAUTIFUL HUDSON

The buildings of the United States Military Academy at West Point, New York, are imposing. Here is a view of a small part of them, taken from the roof of another building. The river beyond is the Hudson, at the point where it breaks through a gap in the Highlands. Since 1902, many new buildings have been erected, making room for many more cadets than formerly. The views around the Academy are superb.

The reservation around the Academy, including Constitution Island in the river, which also belongs to the United States, amounts to about five and a half square miles. The parade ground is large enough for the exercise of a considerable body of troops. Here we see the cadets on parade, watched by many interested spectators. The cadets are famous for the accuracy and precision with which they go through the drill.

SUMMER WORK AT WEST POINT

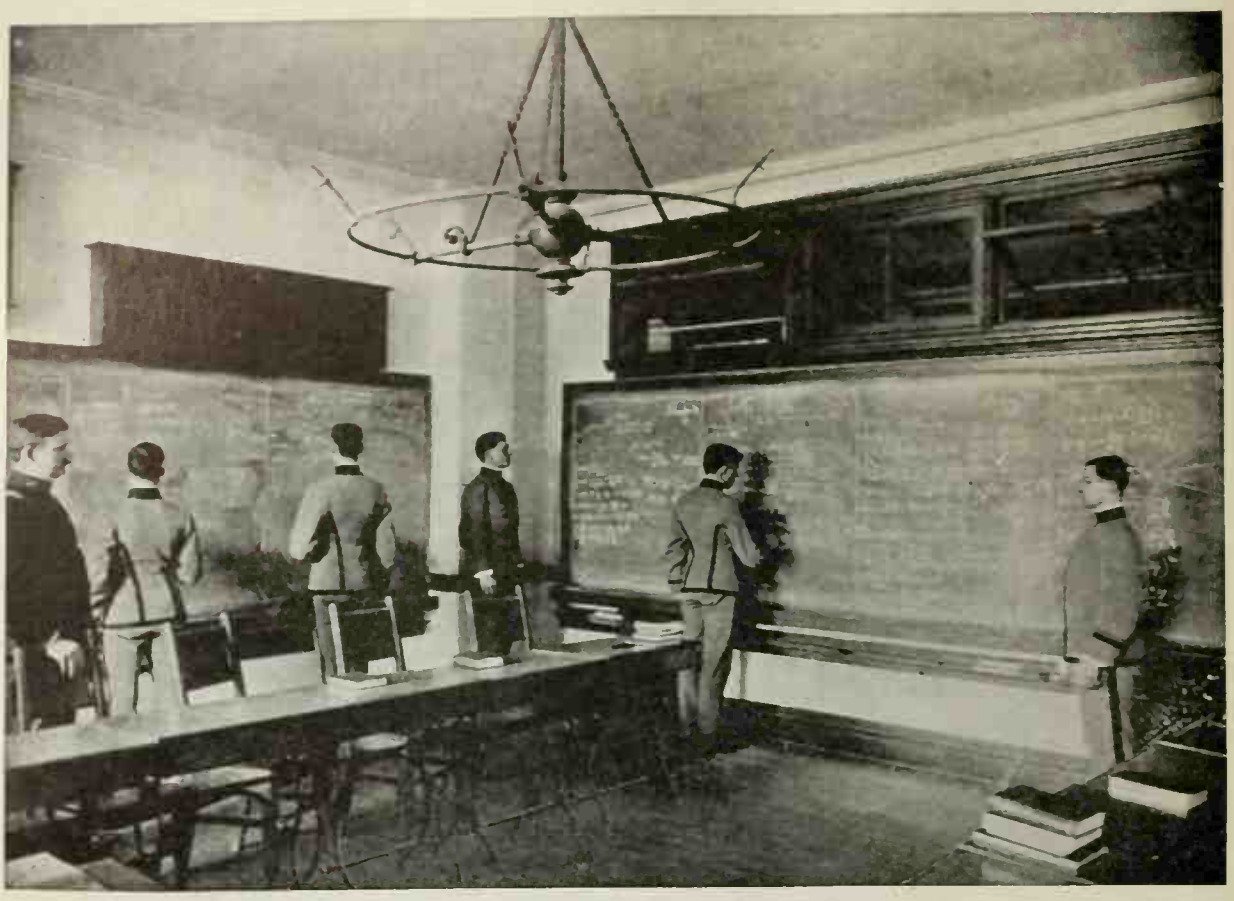
Cadets at West Point are drilled as infantry, artillery and cavalry. Here you see a group engaged as light artillery. The gun is being put together, and the horses are ready to draw it to the proper place.



During the summer, the cadets move to summer camp on the grounds of the Academy, where they live in tents. Here "inspection" is going on. The cadet officer is examining the guns and equipment, seeking to find a speck of dirt. The cadets here are in the dress summer uniform, worn only on special occasions. Such caps and coats were worn by the army years ago, but have been discarded for the khaki uniforms.

Every West Point cadet must be able to ride any horse he is likely to find in the army. Here is cavalry drill on the ample grounds of the Academy. Lessons in riding are given indoors in the great riding hall.

HOW A WEST POINT CADET LEARNS



When a cadet has finished his problem, he turns toward the instructor and stands at attention until called upon to recite. Then he turns to the blackboard and explains his work. If his work is correct and his explanation full and clear he receives a high mark, but if the instructor must ask a question to make the explanation clear, a deduction is made, even if the work is correct. The instructors are chiefly officers.

Two cadets are assigned to a room, which they must keep in order themselves. Everything must be in its proper place, and neither must use the other's things. The beds must be left exactly as the rule requires. The regulations fix exactly the place where towels, soiled clothes, and even whisk-brooms must be kept. No litter is allowed, and each cadet must post his schedule showing where he may be found at any hour.

CHAPEL AND BANCROFT HALL, ANNAPOLIS

The Impressive New Chapel at Annapolis. The Body of Paul Jones is in the Crypt.

The United States Naval Academy at Annapolis, Maryland, was founded in 1845, as a school to train naval officers, and received its present name in 1849. Since about 1900, many new buildings have been constructed, and now it is the most complete naval school in the world. This is only a part of Bancroft Hall, the immense building used as a dormitory for the midshipmen. The building was named in honor of George Bancroft, the historian, who was Secretary of the Navy when the Academy was organized.

other is Dahlgren Hall, the armory. Behind Bancroft Hall is the Academic Group, which consists of Mahan Hall, Maury Hall, and Sampson Hall. All are named for distinguished officers. Isherwood Hall is behind these, and the Chapel, and the officers' residences are to the south.

The midshipmen are appointed very much like the cadets at West Point. Each Senator and Member of the House of Representatives is allowed to appoint three, and as one is graduated, resigns or is dropped, he may fill his place. Two are allowed to the District of Columbia, one to Porto Rico and one to the Philippines.

Much attention is given to the use of boats, large and small, and the Academy owns many. The midshipmen are here being towed out to a ship to start on the summer cruise, as you can guess from the baggage. The building is Luce Hall, and is used as a gymnasium. The water is called the Dewey Basin.

The President may appoint fifteen each year, and twenty-five each year may be appointed from the Navy or the Marine Corps.

The newly appointed midshipman may take his examinations for entrance at many places throughout the country. If he passes he reports at Annapolis in June for his physical examination. This examination is even more strict than the examination for West Point. If he is admitted he also becomes a "plebe" and the summer is spent in drill, in gunnery, gymnastics and in the use and management of boats.

Regular work begins in the fall. The course, like that at West Point, is four years. It requires a great deal of mathematics and physics, for a modern battleship is a complicated mass of machinery. The midshipman must also study English, history, and Spanish or French.

The discipline is much like that at West Point, very strict, but fair, and the midshipmen have a good time. They drill also, but their uniforms are blue, instead of gray as they are at West Point. Every summer all classes go for three months on a practice cruise on warships, and then have a month's leave, during which they may visit their homes.

When the midshipmen are graduated they are commissioned ensigns in the United States Navy, or officers in the Marine Corps, and assigned to duty wherever they are needed. As in the army, high rank at Annapolis helps to gain earlier promotion in the navy, and the higher men may be lieutenants while the lower men are still ensigns.

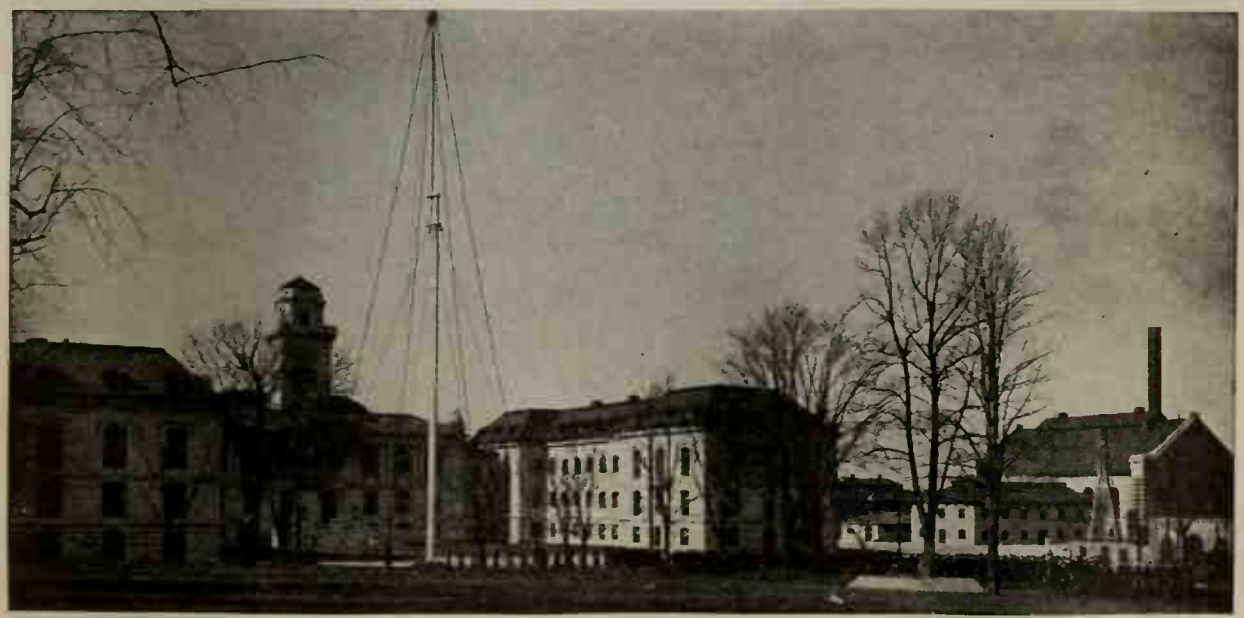
Such are the two great schools to train American officers. They are open to any American boy who can get an appointment, and generally the Members of Congress hold examinations, and give the appointments to those who stand highest. When they enter the schools it does not matter whether their fathers are rich or poor, distinguished or unknown.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 4765.

WORK AND PLAY AT ANNAPOLIS

This is another view of Bancroft Hall, the quarters of the midshipmen, taken in the summer while all of the midshipmen, except the fourth or entering class, were away on the annual practice cruise. It looks out on the water. Luce Hall is on one side and Dahlgren Hall, shown below, on the other.

The midshipmen always have a good football team, and frequently play with college teams. The building on the right is Dahlgren Hall, and beyond is the Chapel. On the left is Porter Road, where many officers who teach in the Academy live. Luce Hall, the gymnasium, resembles Dahlgren Hall in architecture.



This is the Academic Group, with midshipmen marching to and from recitations. The building in the centre is Mahan Hall. Maury Hall is to the right, and the building on the left is Sampson Hall. Here are most of the recitation rooms, though some special subjects are taught in other buildings. Dewey Basin, where the ships lie, is to the right of the picture, near the Power House.

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LADY DERBY DEFENDING HER HOME

This picture by G D. Leslie, R.A., illustrates a striking incident in the gallant defence of Lathom House by Charlotte, Lady Derby, as told on page 4746. When the army of the Parliament laid siege to her castle in the absence of her husband, and summoned her to surrender, Lady Derby indignantly refused, and resisted the besieging forces. Here we see her helping to lash the Royalist banner to the flagstaff on her castle.

A KING WHO LOVED THE POOR

CONTINUED FROM 4663

THERE is no greater hero in all Spanish history than Ferdinand III., King of Castile and Leon, who began to reign in the year 1217. He did much to increase the power and prestige of his kingdom, and it was by his skill and energy that the Christians began to drive the Moors out of Western Europe, where they had held power and sway so long.

Ferdinand was a man well in advance of his time, and in no sphere was this better shown than in war. Instead of killing or robbing the people in the towns that he captured, he allowed them to depart freely with as much of their goods as they could carry. Of course, sometimes he took prisoners, and when in 1236 he captured Cordova, the great seat of the Mohammedan power in Spain, and found the bells of a Christian church being used as lamps in the mosque, he had them carried back on the shoulders of his Moslem prisoners to the church from which they were taken. The bells had originally been conveyed to the mosque by Christian prisoners of the Moors.

Like most great and good men, Ferdinand owed much to his mother, Queen Berengaria, of whom it has been written that she was one of those rare beings who seem to have been born to do right and to have done it. She was an ennobling influence in the life of Ferdinand from his youth up, and made him the pious and sympathetic man he became in spite of evil circumstances all around. Her name is associated only with what is good and worthy and noble in an age of violence and wrong and robbery.

Not only his military prowess, but his justice and love of truth caused Ferdinand to be loved by all his people, and to gain the admiration even of his enemies. While respecting the rights of the rich, he would not allow violence of any kind to be shown to the poor.

He would never make war upon a Christian prince or nation, and only fought the Moors because in the ignorant age in which he lived this was thought to be a holy duty imposed upon every Christian prince.

His love for the poor among his people was shown in many ways, and he was not content to direct from his throne that they should be considered and cared for. He made it a practice to attend to their needs himself, and such scenes as that shown in the picture on this page were by no means uncommon, when the king, dressed in his royal robes, waited upon the beggars, who were given a feast at their sovereign's

expense. This would be conduct worthy of the highest praise in a monarch to-day; but when we remember the cruel and barbarous and selfish age in which Ferdinand lived, it is indeed a striking instance of how a man may be a real hero, and do truly golden deeds in quite another sphere than that of war. Ferdinand, for his kindness to all around him, well merits the rank and honor of Saint, a title, however, that the Church bestowed upon him less for his gracious acts of kindly sympathy than for his austere religious life and his continued and persistent attempts to convert the Moors to Christianity.

THE GALLANT DEFENCE OF LATHOM HOUSE

ONE of the brightest episodes in the English Civil War was the gallant defence of her castle home by a woman. James, Lord Derby had marched to join King Charles, leaving his wife, Charlotte, the beautiful daughter of Claude de la Trémouille, a French nobleman, in Lathom House with a guard of but 300 men and servants, little thinking that the forces of the Parliament would come that way. But Lathom House, in Lancashire, was fortified with a wall two yards thick, strengthened by nine towers, each of which contained six pieces of cannon, and with a palisade and moat within. The Parliamentary army accordingly determined to capture it, and threw up earthworks some 200 yards away from the walls. On February 27, 1644, came General Sir Thomas Fairfax, to take charge of the siege. The next day he sent a messenger to Lady Derby, saying:

Charlotte, Lady Derby.

See also picture on page 4744.

"The Parliament sends you this ordinance, requiring of you that you do yield up Lathom House upon honorable conditions, and they declare that their mercy shall be shown to your husband if he will submit to their authority."

"Greatly surprised indeed am I," replied the countess, with spirit, "that Sir Thomas Fairfax should require me to give up my lord's house, since no offence against the Parliament had been committed. Go, tell Sir Thomas that I desire a week's truce wherein to consider this demand."

Fairfax realized that this was but a ruse to gain time, and sent back word refusing this request, and inviting her to come to Lord Derby's other house in New Park, saying:

"I will take you there myself in my own coach, and, when there, my colonels and I will discuss with you."

Lady Derby promptly refused, saying: "My birth, my sex, and the honor of my lord demand that you should come to me, and not I to you."

The siege went forward. Lady Derby lashed the Royalist banner to the Eagle Tower, the keep of her castle, and conducted the defence with energy and a calm courage. She sent out successful sallies, which effected captures of both arms and prisoners, with but very little loss. All that April cannon and mortar rained chain-shot, stones, and bars of iron upon walls and towers, but with little effect. On one occasion a shot thrown by a large mortar fell into the room where Lady Derby was dining with her children and officers. The heroine rose from the table, found that no one was injured, and instantly ordered another sally. Rigby, Fairfax's successor, sent in another letter demanding surrender. Lady Derby tore it in pieces, and, summoning the messenger before her, exclaimed:

"Your reward for this work should be that I should hang you at my gate, but you are only the foolish instrument of a traitor's pride. Tell the insolent rebel, Rigby, that he shall have neither persons, goods, nor house of mine. When we are spent, we shall find a fire more merciful than he is; and then my goods and my house shall burn in his sight, and we all will seal our religion and loyalty in the flames together rather than fall into his hands."

The soldiers present shouted:

"We are willing to die for your honor and his Majesty the King!"

On May 25 word was brought that Prince Rupert was marching to relieve her. The besiegers soon heard of this, and on May 27 raised the siege.

THE NEXT GOLDEN DEEDS ARE ON PAGE 4799.

THE STORY OF OUR MINDS

WE come now, in our story of our own life, to the most interesting and wonderful thing in the world. We have read the story of our bodies, the parts of us that we see, and know, and feel. But our body is a servant, and we are now to read of its master. We take up a pen to write, but the hand acts at the bidding of its master, the mind. What is the mind? Not all the wisest men who have ever lived have been able to understand the mind of a little child. It is the mind that knows whatever we know, yet we know less about the mind itself than about anything the mind knows. One thing about the mind we know—that without it we should know nothing.

THE MASTER OF THE BODY

CONTINUED FROM 4637

THE first great fact about the mind is that here is something which is real, and yet which cannot be taken hold of. It is not a part of the body. Any part of the body, even the nerves or the highest part of the brain itself, can be seen, touched, or cut. The body is a material thing, as material as a hard, solid rock or a piece of earth.

Now, if we take a rock and weigh it, examine it chemically, and in all the other ways in which a material thing can be examined, we learn all there is to learn about the rock. But we know very well that, if our bodies were to be examined, as a rock is examined, there would be a tremendously important fact about them missed altogether—the fact of sensation, which does not exist in the case of the rock.

The things we are likely to believe in most are things we can see and handle, and it requires an effort of the mind to realize that there are great realities in the world which cannot be seen and handled and are utterly different from anything in the world that can be seen or handled. Such a reality is the vision of this page, as we read at this moment. The eye and the brain are not sight; they are its organs or instruments; sight is something else. The eye and the brain might be examined for a thousand years under the microscope, in test-tubes; but, whatever else we found, we should never find *sight* there, because we have now left the realm of the physical world, made up of matter and ether and motion, and we have entered another realm, which is the world of mind. The greatest of all follies is to believe that the real world is the world of matter and ether and motion, and that, somehow or other, sensation and feeling and thought and will are not real, but imaginary things that grow out of matter and have no meaning. That is the doctrine of materialism, and it is a stage that many people's minds pass through when they begin to think; but if they go on thinking, they always, sooner or later, pass beyond it.

Therefore, we must understand that when we study sensation we are studying something which is more important, more wonderful, and more real than anything we have studied yet, either in the Story of the Earth or in the Story of Our Own Life. Indeed, we have only to think for a moment to see that everything we know, or think we know, about the outer world and about our own bodies, is known to us through our senses.

If they are not real, and if they are not trustworthy, we know nothing that we think we know, nor can we ever know anything. More than this, the truth is that we know nothing at all but our sensations. Everything we suppose as to the outside world is an argument based on the

knowledge that we have gained through our senses. It is only, indeed, an argument on our part that other people feel as we do. We can never get outside our own minds, and we can never get into the mind of anyone else. Our senses tell us that other people act as we do, and so we suppose that they feel and think as we do, though we can never feel their feelings.

We have already seen that the senses are of many different kinds. There is an important group of them which merely tell us about our own bodies, and another group which tell us about the outside world. For a long time it was supposed that our minds, our beliefs about things, our feelings, and our will depended entirely upon the senses that have to do with the outside world, such as sight and hearing. It is one of the great discoveries of recent years that the senses which have to do with our own bodies play a great part of their own in the training of the mind, and in the daily lives of our minds.

THE INVISIBLE THINGS UPON WHICH HUMAN HAPPINESS LARGELY DEPENDS

Feelings of hunger and thirst, feelings derived from the movement of the heart and the lungs and the organs of digestion, feelings from the joints and the muscles, all enter into our minds. In very great measure our happiness or unhappiness depends upon the quality of the feelings that come into our minds from our bodies as well as upon our outside surroundings. Compare an unhappy millionaire suffering from indigestion and a healthy street boy in the rain.

Perhaps the greatest importance of the study of the body lies in the fact that it is beginning to teach us how to help human happiness, which depends far less than we suppose on things outside, and far more upon invisible things which get at our minds from within.

These sensations from the body all have the common fact about them that they are vague and not well defined. There is a great contrast between these vague feelings and a precise, sharp, definite sensation, such as we get from the eye or the ear, and that contrast exists, as a rule, between sensations from within and sensations from without. Now let us suppose that it were possible for a human being to grow up without getting any sensations, whether from within or from without. What sort of person would he be? What sort of a mind would he have? What would he think about? What would he know? When we place before ourselves questions like these, we see the answer at once.

A MAN WHO COULD KNOW NOTHING AND THINK NOTHING

Such a person would have no mind; he would be merely a body, like a cabbage—humbler, indeed, for even a cabbage has some sensations. A man of this kind could know nothing and think nothing. That, then, is what we mean when we say that the mind is built upon sensation. The senses are not merely the gateways of knowledge, but if they let nothing in, the mind itself, which knows, could not develop.

All this great question was ably worked out by an immortal Englishman, John Locke, more than two hundred years ago. Very little was known at that time about the eye and the ear; still less was known about the sense of balance and the other internal senses. But that did not prevent Locke from taking up the question in general, and placing it upon a firm basis for all time.

He came to the conclusion that nothing is in the mind that was not first in the senses, and that the whole of our knowledge and ideas and beliefs depend upon two things, and two things only. These things are sensation, in the first place, and, in the second place, reflection upon what the senses tell us.

Now, all this is not merely a matter that has no practical meaning. It is impossible to name any beliefs which are of greater practical importance than these. Their real meaning for our lives, and for the lives of all the children who are to come, is that they give us the key to real education. If the mind is built upon the senses, then assuredly, if we want the best possible mind, we must do our best for the senses. The real difference between a high kind of person and a low kind of person depends in the beginning, upon their senses.

HOW THE EDUCATION OF A CHILD SHOULD BEGIN

The question, as we have seen, is not one of mere keenness, but it is a question of delicacy of sensation—the power to distinguish between one sensation and another, the power to remember and recognize them, and the power to associate

them together in our minds. All real education of the mind, then, must begin by recognizing that the mind is built upon the senses, and depends upon them for its operations.

This means that we shall begin to care little about teaching facts and ideas, arithmetic, language, and such things, to small children, and that we shall begin by saying to ourselves that our first duty is to the child's senses. These are the avenues of knowledge, and the mind is taught by them. It is therefore wicked folly to attempt to teach a child history or geography when it is half deaf for lack of attention to its throat and nose and ears, or half blind for lack of spectacles that are suited to its eyes.

Our very first duty is to see from beginning to end that all the senses of the child are as well as can be. When we have the child before us with healthy senses, our next business is to train it; it must be taught to see differences between things; it must learn to appreciate beauty of color and form.

THE THINGS UPON WHICH A CHILD'S MIND SHOULD BE BUILT

We must take great care that the child sees beautiful things, and if things of ugly shape and ugly color are shown to it, it must be taught to see that they are ugly. If we provide it with pictures, plain or colored, they must be simple and beautiful. There is no more reason why we should expose a child to ugly sights than to ugly smells. We must do the same as regards the child's ears; it must learn to know the difference between a beautiful voice and an ugly one, both in speaking and singing.

Children should be trained to recognize the tone of different musical instruments, and to know when a piano is in or out of tune. They should learn to recognize the notes of birds and the other sounds of Nature. If a child were well trained in all these matters—and in many more that might be named—but not in any book knowledge, people might very likely say that the child was ignorant and had been neglected; but such a child, especially if its brain is being taken care of by plenty of sleep and fresh air, is certain in after years, to outstrip children less wisely brought up. Such a child will be happier and healthier, and when he or she is in the early or late teens, and begins to do a good deal of book-work, will learn more quickly, more thoroughly, and will remember better than other children. The foundations of that child's mind have been rightly and solidly laid.

THE CHILD WHO GREW IN SUN AND SHOWER

These great truths have never been more perfectly expressed than in Wordsworth's noble poem, beginning, "Three years she grew in sun and shower," which we read in another part of this book. In it he describes his ideas of the education of a girl. She was to be educated by the clouds and the willow-trees, and by the motions of the storm:

> The stars of midnight shall be dear
> To her; and she shall lean her ear
> In many a secret place,
> Where rivulets dance their wayward round,
> And beauty born of murmuring sound
> Shall pass into her face.

In his boyhood this great poet was educated by the company of his sister. She loved him greatly, and devoted her whole life to him. She herself had noble and beautiful ideas, which she often gave as suggestions to the brother whose happiness was of more importance to her than anything in the world. So they lived peacefully together, and this, he tells us, is what he owed to her:

> The blessing of my later years
> Was with me when a boy;
> She gave me eyes, she gave me ears,
> And humble cares, and delicate fears;
> A heart, the fountain of sweet tears;
> And love, and thought, and joy.

As a rule, when we talk of mind, we usually mean just the part of the mind that thinks and knows. In other words, we are too apt to suppose that really the whole of the mind is made by the intelligence or the intellect.

THE NEW STUDY OF THE MIND THAT BEGINS AT THE BEGINNING

We think that the mind is the part of us which knows, and are far too apt to leave out of account the part of us which feels and desires and does. It is no doubt true that the part of the mind which most distinguishes us from other creatures is the knowing part of the mind, and that is a great reason for attaching special importance to it and giving it our utmost study.

But it was not until men began to study other parts of the mind that the key to the great question of human conduct began to become clear. This

great stage in the history of our knowledge was begun by the work of Herbert Spencer in 1855, and a great scientist afterwards declared that on this foundation, so well laid, there would be raised a new study of the mind.

Up to Spencer's time most English students had simply studied the intellect. But Spencer saw that they were making the great mistake of not beginning at the beginning. He declared that if we are to study the mind of the highest type of man when he is grown up, and more especially if we are at all to understand not only his ways of thinking, but his ways of doing, we must really try to begin at the beginning. We must study the mind in all its forms; we must study the minds of women as well as men; we must study the minds of children. Other races of mankind have differences in their minds; we must learn the ways of uneducated people and of savages as well as of educated people. We must even learn all we can of the senses, instincts, habits, and doings of the lower animals.

THE IMPORTANCE OF STUDYING THE WHOLE MIND AND NOT MERELY A PART

We know that Genesis, the name of the first book of the Bible, means "the bringing forth." So this study of the mind—which tries to go back to the beginnings to see how our minds are made and have been brought forth—is called the *genetic* study of the mind, and all our modern methods of studying the mind and coming to understand it are more or less based upon this new way of looking at it.

One great result in the last half-century of work on this subject has been to remind us of the importance of many parts of the mind which are not the intellect at all. The study which took no notice of habit and of feeling and instinct, which really took no notice of anything except the way in which we get ideas and the way in which we reason about them, was not the whole study of the mind, and was probably not even the most important part of it. Nay, more; even that could not be successfully studied and understood if the rest of the mind was forgotten. How, for instance, if we forgot all the rest of the mind, should we be able to learn the way in which our ideas and beliefs and judgments of things and of people are so often affected or, indeed, quite decided by our feelings?

But now that we are sure not to make the great mistake of supposing that the knowing and reasoning part of the mind is the whole of the mind, and that feeling is not quite as important as thinking, we may go on to study what becomes of these sensations of ours, and how the intelligence and the intellect are built up out of them.

HOW WE MAY SEE A THING AND YET NOT SEE IT

Such a thing as a flash of light or a sudden sound will produce certain results in us, perhaps, but we cannot be said to think; we simply "sense." Now let us suppose that a little more time is given to us, and that instead of a mere flash of light, there is light coming from something that has parts and a shape—say, from a tree. Suppose that we see this tree very indistinctly from a great distance or in half-darkness, and that we do not expect to see a tree in that place. At first, as we say, we see it, but we do not see what it is.

We have all noticed this in a thousand cases. Sometimes in a picture or a photograph we cannot make out what is there. It is not that we are blind; we are seeing or "sensing," perfectly, but we have not put together the lines and forms and lights and shadows so as to make a whole of them.

Now, this is the next great stage in the building up of the mind. The stage of mere seeing yields to the stage of perceiving. The first stage was *sensation* and the second stage is *perception*, and the difference between them is tremendous, because though mere sensation, as of light, may have definite effects in causing us to move to or from the light, yet if seeing never went on to perceiving, intelligence could never possibly be formed.

THE DIFFERENCE BETWEEN SEEING A THING AND PERCEIVING IT

We ought to think of this and notice for ourselves. The interesting thing about the study of the mind is, that we always have material at hand to study—our own minds and the minds of other people. Now, when we think of the difference between mere seeing and perceiving, we discover how very important the memory is to all of us.

THE NEXT PART OF THIS IS ON PAGE 4855

A FAMOUS FRENCH STORY

LUDOVIC HALÉVY, who was born in Paris on January 1, 1834, and died on May 9, 1908, was a celebrated author of plays and operas. He had only written two or three stories when, in 1882, he published "The Abbé Constantin," which won for him wider and enduring fame. In those days the popular literature of the Parisians stood in need of being made more wholesome. So Halévy wrote this beautifully fresh and pure story. It was a return to simplicity and the admiration of honest, healthy people. We American readers have to remember, of course, that it is a story of life unlike ours, but we must always admire goodness and charity in all people, no matter what may be their peculiar customs. The custom, in addressing a French vicar, is to call him "Monsieur le Curé," which literally means "Mr. the Vicar," but as it cannot be given in an English equivalent, the French phrase is retained in this little version of the original story.

THE ABBÉ CONSTANTIN

CONTINUED FROM 4646

WITH footstep firm and strong, despite his weight of years, a venerable village priest was walking along a dusty country road one sunny day in May, 1881. It was more than thirty years since the Abbé Constantin had first become vicar of the little village sleeping there in the sunny plain of France, beside a beautiful little river called the Lizotte. The village was one that had grown up under the shadow of the historic castle of Longueval, and had always looked to the castle for the chief interest of its life. Throughout the Abbé Constantin's long and serene days as the spiritual guide of this little village, he had experienced much happiness in his relations with the owner of the castle. For many years he had dined there every Thursday and every Sunday. He was a good and gentle soul, and the old marchioness had loved to see him at her friendly table, where he was as much at home as in the houses of his poorest parishioners.

But, alas! these days were no more, and now he stood outside the castle gates gazing sadly at two immense announcements printed on blue paper and pasted on the pillars. The castle was for sale. For the old marchioness had recently passed away, and as her only son had died eight years before, her estate was inherited by three grandchildren, two of whom were under age, so that the whole had to be sold by the trustees. Her grandson Peter was a foolish young man, given to extravagance, and there was no chance of his being able to repurchase the castle. The good abbé was sad at heart, to think that it might pass into the hands of someone who would not take the kindly interest the late owner had always shown in the welfare of the villagers. When he thought of how the altar of his little church used to be beautified in the month of May with sweet flowers from the conservatories of the castle, and how bare it was this year, he felt that the good work of his little church had indeed lost an invaluable as well as a much-loved friend.

As he stood there reading the advertizements of the sale, which announced that the property would first be offered in four lots: (1) the castle with all its beautiful grounds and far-stretching parks; (2) the farm of White Crown, some 700 acres in extent; (3) the farm of Rozeraie, 500 acres; and (4) the woods and forest, extending to some 900 acres—these were first to be bid for separately, and then the whole property was to be offered if a purchaser could be found to take over the entire estate—the abbé had little hope that anyone would buy all the lands of Longueval, and

it grieved him to think that this splendid estate might now be split up among different owners. Resuming his walk along the highway, and still in pensive mood, he was passing the park of Lavardens when he heard someone calling him. Looking up, he saw the Countess of Lavardens and her son Paul. She was a widow. Her son was a handsome young man who had made a bad start in the world and now contented himself by spending some months in Paris every year, when he dissipated the annual allowance from his mother, and returned home for the rest of the year to loaf about in idleness or in pursuit of stupid sports.

THE DAY OF THE SALE OF HISTORIC LONGUEVAL CASTLE

"Where are you off to, Monsieur le Curé?" asked the countess.

"As far as Souvigny, to learn the result of the sale," he replied.

"You will know that soon enough if you stay here with us on the terrace, for our neighbor, M. de Larnac, is there, and will hasten back with the news. And, what is more, I can tell you who are the new owners of the castle."

At this the abbé turned into the gates of the countess's place, and joined that lady and her son on the terrace of their house. The new owners, it appeared, were to be M. de Larnac, M. Gallard, a rich Paris banker, and the countess herself, for the three had agreed to purchase it between them.

"It is all settled," the lady assured him; but presently M. de Larnac arrived with the news that they had been unable to buy it, as some American had paid an enormous sum for the entire estate. The person who was now to be the great lady of Longueval was named Mrs. Scott. At the announcement of the name. Paul made an exclamation of surprise.

WHY THE ABBÉ CONSTANTIN WAS SAD AT THE SALE OF THE CASTLE

It appeared he had been at a ball in Mrs. Scott's house in Paris the previous week, and he voted her a charming lady, although she had only newly acquired her wealth, and was making a great show in Paris. M. de Larnac had some further particulars to add. He had heard that the Scotts were great upstarts, and that the new owner of the castle had actually been a beggar in New York. A great lawsuit had resulted in favor of her and her husband, making them the owners of a silver-mine.

"And we are to have such people for neighbors!" exclaimed the countess. "An adventuress, and no doubt a Protestant, Monsieur le Curé!"

The poor abbé was really very sore at heart, and, never doubting but that the new mistress of the castle would be no friend of his, he took his way homeward. In his imagination he saw this Mrs. Scott settled at the castle and despising his little Catholic church and all his simple services to the quiet village folk.

He was still brooding over the unhappy fate of Longueval, when his godson, Jean Reynaud—son of his old friend Dr. Reynaud—to whom he had been as good as a father, and who was worthy of the old priest's love, dismounted at his door. For Jean was now a lieutenant in the artillery stationed in the district, and much of his leisure was spent at the abbé's house.

Jean tried to console him by saying that even though this American Mrs. Scott were not a Catholic, she was known to be generous, and would no doubt give him money for the poor.

THE ABBÉ, TO HIS GREAT SURPRISE, FINDS TWO NEW PARISHIONERS

The abbé and his godson were in the garden next day, when they heard a carriage stop at the gate. Two ladies alighted, dressed in simple traveling costumes. They came into the garden, and the elder of the two, who seemed to be no more than twenty-five, came up to the Abbé Constantin, saying, with only the slightest foreign accent: "I am obliged to introduce myself, M. le Curé. I am Madame Scott, who yesterday bought the castle and estate, and if it is no inconvenience I should be glad to take five minutes of your time." Then, turning to her companion, she said: "This is my sister, Miss Bettina Percival, as you may have guessed."

Greatly agitated, the abbé bowed almost in silence, and led into his little vicarage the new mistress of Longueval and her sister. The cloth had been laid for the simple meal of the old priest and the lieutenant, and the ladies seemed charmed with the humble comfort of the place.

"Look now, Susie," said Miss Bettina to her sister, "isn't this just the sort of vicarage you hoped it would be?"

"And the abbé also, if he will allow me to say so," said Mrs. Scott. "For what did I say in the train this morning, Bettina, and only a little while ago in the carriage?"

"My sister said to me, M. le Curé," said Miss Percival, "that she desired, above all things, that the abbé should not be young, nor melancholy, nor severe; but that he should be white-haired and gentle and good."

"And that is you exactly, M. le Curé," said Mrs. Scott brightly. "I find you just as I had hoped, and I trust you may be as well pleased with your new parishioners."

"Parishioners!" exclaimed the abbé. "But then you are Catholics?"

"Certainly we are Catholics!" And, noting the surprise of the old abbé, she went on to say: "Ah, I understand, our name and our country made you expect we should be Protestants and unfriendly to you and your people. But our mother was a Canadian and a Catholic, of French origin, and that is why my sister and I speak French with just a little foreign accent."

How the sorrow of the village priest was turned to joy

"My husband is a Protestant, but he leaves me full liberty, and so my two children are being educated in my own faith. And that is why we have come to see you the first day we have arrived."

The good old priest was overwhelmed by the news, but his joy almost brought tears to his eyes when the ladies each presented him with a thousand francs, and promised five hundred francs a month for the poor. He had never handled so much money in all his life before.

"Why, there will be no poor left in all the district!" he stammered.

"And we should be glad if that were so," said Mrs. Scott, "for we have plenty, and we could not do better with it."

Then followed the happiest little dinner-party that had ever taken place beneath the abbé's roof. Mrs. Scott explained how her husband had bought the castle as a surprise for her, and that neither she nor her sister had seen it until that morning.

"Now, tell me," she suggested, "what they said about the new owner." The old priest blushed, and was at a loss to answer. "Well, you are a soldier," she continued, turning to Lieutenant Reynaud, "and you will tell me. Did they say I had been a beggar?"

"Yes, I heard that said."

"And that I had been a performer in a traveling circus?"

"That also I heard said," he admitted.

The young lieutenant who wondered if he was in love

"I thank you for your frankness; and now let me tell you that, while I can see nothing in either case that would be any disgrace to me, the story does not happen to be true. I have known what it is to be poor, for my parents died eight years ago, leaving us only a great lawsuit, but my father's last wish was that we should fight it to the end. With the aid of the son of one of his old friends, now my husband, we fought and won. That is how I came into my fortune. The stories you have heard were invented by spiteful Paris journalists."

After the ladies had taken their departure for Paris, the Abbé Constantin was as happy as he had so lately been miserable. And as for Lieutenant Reynaud, the vision of their fresh and charming faces was with him all through the military manœuvres in which he was now engaged. But as both of them were equally charming in his mind, he concluded he could not have fallen in love, or he would have known which he admired the more.

He did not know how many the suitors were in Paris for Miss Bettina, and possibly if he had seen the sisters there among the fashionable people of that gay city he would never have given them a second thought, as he was a true son of the country, this healthy and manly young officer, whose tastes were as simple as the surroundings in which he had grown up demanded.

The young heiress who knew when she was in love

Miss Bettina, indeed, had only to say the word, and she might have been the Princess of Romanelli. "And I should like to be a princess, for the name sounds well," she said to herself. "Oh, if I only loved him!" There were many men of rank and title who would have been glad to have married the wealthy young American lady, but she found herself in love with none of them, and now she was looking forward to the fourteenth of June, when she and her

sister were to leave Paris for Longueval. During their stay at the castle they were to entertain many friends, but for ten days they were to be free to roam the woods and fields and forget the distractions of their fashionable life in the capital.

"But you forget," said Mrs. Scott, on their way to Longueval, "that we are to have two people to dinner to-night."

"Ah, but I shall be glad to welcome both of them—particularly the young lieutenant," Miss Bettina confessed to her sister, with a touch of shyness.

THE ABBÉ AND JEAN AS GUESTS OF THE NEW LADY OF LONGUEVAL CASTLE

Great alterations had been made at the castle during the month that had elapsed. The rooms had been refurnished, the stables and coach-houses were stocked, the pleasure-grounds made trim and beautiful, and servants were busy everywhere. When the abbé and Jean arrived, they were ushered in by two tall and dignified footmen, but Mrs. Scott received them with all the frankness she had shown at the vicarage, and presented her son Harry and her daughter Bella, who were six and five years old. Then Miss Percival joined them, and presently they were all talking together like old friends. Jean and Bettina found much to say to each other, and as the ladies were looking forward to riding round the estates, Jean, who rode every day for exercise, promised to join them. It was quite clear that Miss Bettina was glad to see them both —"particularly the young lieutenant!" And when Mrs. Scott and her sister walked up the avenue, after having accompanied Jean and the abbé to the gate, Bettina confessed that she expected to be scolded for being so friendly with Jean.

"But I shall not scold you," Mrs. Scott said, "for he has made a favorable impression on me from the first. He inspires me with confidence."

THE FRIENDSHIP OF JEAN AND BETTINA AND HOW IT GREW.

"That is just how I feel towards him," said Bettina quietly.

As for Jean, he talked so much to Paul about his visit that that gay young man accused him of having fallen in love, but, of course, that was mere nonsense! There was no fear of Jean's falling in love! For a poor lieutenant could never dream of winning an heiress for his wife. When next he met Bettina they had a very long talk about their people, and it appeared that they were both descendants of French peasants. That was why Jean loved the country-folk around Longueval. And when he had served his time in the Army, he thought he would retire on half-pay—an old colonel, perhaps—and come back to live there.

"All alone?" asked Miss Bettina slyly.

"Why, I hope not."

"Oh, then you intend to marry!"

"Well, one may think of that, though one need not be always looking for a wife."

"Oh, but I know something of your affairs, and I have heard that you might have married a girl with a handsome fortune if you had wished."

"And how do you know that?" asked Jean.

"Monsieur le Curé told me. And may I ask why you did not take the chance?"

"Simply because I thought it better not to marry at all than to marry without love," was Jean's frank avowal.

WHAT HAPPENED WHEN JEAN RODE AWAY WITH HIS REGIMENT

"I think so, too," said Bettina; and suddenly the two young people, to their mutual surprise, found nothing more to say—nothing at all. So it was lucky for them that Harry and Bella burst into the room with an invitation to see their ponies.

Three weeks, during which Longueval had been crowded with visitors, passed, and the time came for Jean to take the road for the annual artillery practice. He would be away for twenty days, and, while he wished to be off, he wondered how those twenty days would pass without a sight of Bettina, for now he frankly adored her. He was happy and he was miserable. He knew by every action and every word that she loved him as truly as he loved her. But he felt it his duty to fight against his own heart's wish, lest the penniless lieutenant might be thought to covet the riches of the young heiress.

But he could not drag himself away without one last meeting. Yet when he saw how anxious Bettina was to please him and make him happy with her

friendship, he was afraid to hold her in his arms lest he might be tempted to tell her how full his heart was with love for her. She excused herself to Paul de Lavardens, so that she might give his dance to Jean; but Jean declined the favor on the plea that he was not feeling well, and to save himself he hastened off with scarcely a word of farewell.

But all this only told his secret the more clearly to the heart that loved him.

"I love him, dear Susie," said Bettina that night, "and I know that he loves me for myself; not for the money I possess."

"You are sure, my dear?"

"Yes, for he will not speak, he tries to avoid me. My horrid money, which attracts others to me, is the thing that keeps him from declaring his love."

"Be very sure, my dear, for you know you might have been a marchioness or a princess if you had wished. You are sure you will not mind being plain Madame Reynaud?"

"Absolutely; for I love him."

BETTINA'S PROPOSAL AND JEAN'S RESOLVE TO GO AWAY FROM LONGUEVAL

"Now let me make a proposal," Bettina went on. "Jean will be away for three weeks, and at the end of that time may I go and ask him if he will have me for his wife? Tell me, Susie, may I?"

Of course, her sister could but consent, and Bettina was happy.

Next morning she had a wild desire to wave Jean a good-bye. In the pouring rain she made her way through the woods to the terrace by the road, her dress torn by the thorns, and her umbrella lost, to wave to him as he passed, saying to herself that this would show him how dear he was in her thoughts.

Mr. Scott had come from Paris before Jean was back, and he, too, approved of Bettina's plan, for they wished her to marry only one she truly loved. But when the lieutenant came back with his regiment, he had made up his mind to avoid meeting Bettina, and had even decided to exchange into another regiment. He refused an invitation to the castle, but the good abbé begged of him not to leave the district.

"Wait a little, until the good God calls me; do not go now."

Jean urged that honor made it clear to him he should go away. The abbé told him that he was quite sure Bettina's heart was all for him as truly as he believed Jean's love was all for her. Her money, Jean confessed, was the great drawback, as it might make others think lightly of his love for her. Besides, he was a soldier, and he could not condemn her to the life of a soldier's wife.

WHAT BETTINA CONFESSED TO THE ABBÉ AND THE OLD PRIEST'S ADVICE

The abbé was still trying to convince his godson, when there came a knock at the door, and the old man, opening it, admitted—Bettina!

She went straight to Jean and took him by both hands, saying: "I must go to him first, for less than three weeks ago he was suffering!" The young lieutenant stood speechless. "And now to you, M. le Curé, let me confess. But do not go away, Jean, for it is a public confession. What I have to say I would have said to-night at the castle, but Jean has declined our invitation, and so I have come here to say it to M. le Curé."

And thus it was to the Abbé Constantin that she confessed her love for Jean and her firm resolve to marry someone who loved her for herself. Jean, before this frankness and this courage, had to speak the truth of the love that was in him, and Bettina explained that she would not think of asking him to give up his career as a soldier.

"And now, M. le Curé, it is not to him but to you that I speak. Tell me, should he not agree to be my husband?"

"Jean," said the old priest gravely, "marry her. It is your duty, and it will be your happiness."

Jean took Bettina in his arms, but she gently freed herself and said to the abbé: "I wish—I wish your blessing." And the old priest replied by kissing her paternally on both cheeks.

THE HAPPIEST DAY IN THE LIFE OF THE ABBÉ CONSTANTIN

One month later the Abbé Constantin had the happiness of performing the marriage ceremony in his little church, where he had consecrated all the happiness and goodness of his life. It was a great day. Jean's brother officers took part in the rejoicings, and the festivities which took place at the castle exceeded anything the abbé had ever imagined in his simple life.

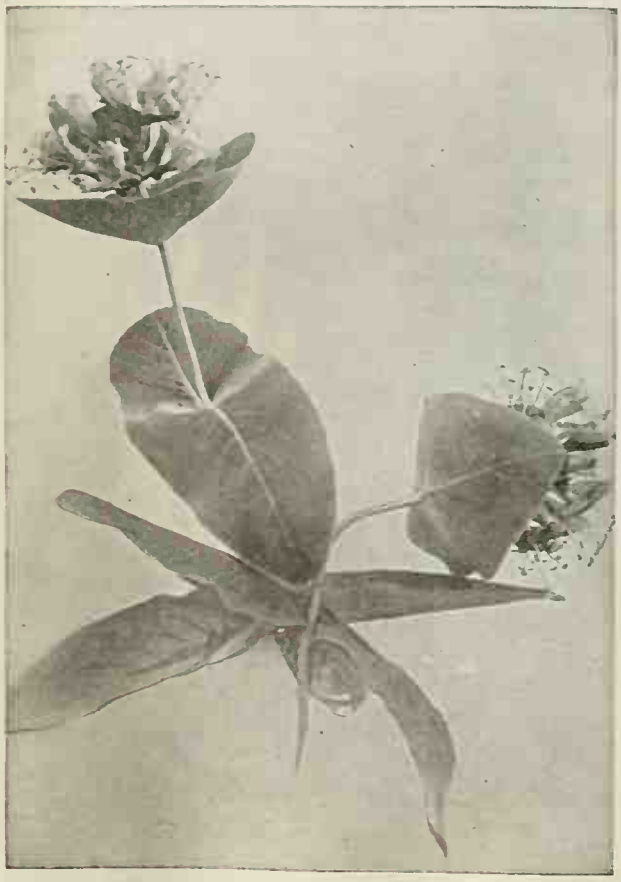
THE NEXT FAMOUS BOOKS ARE ON PAGE 4909.

THE ALPINE MEADOW-RUE

This graceful little plant, with its purple flowers, is found principally upon the mountains of Wales and Scotland, and grows about six or eight inches high. It is unlike the family to which it belongs.

THE MOUNTAIN SORREL

This plant resembles the common sorrel of our meadows, but is shorter and stouter. The leaves grow on long stalks, and the green flowers are in clustered spikes. It grows in damp places on mountains.



THE GLAUCOUS HONEYSUCKLE

This honeysuckle is a midsummer bloomer, which stands upright, holding in its thick double leaves, as in a bouquet-holder, clusters of honey-colored flowers resembling those of the cultivated honeysuckle.

THE CLETHRA

Clethra can be easily found in swampy lands of the Atlantic coast by the rich, far-flung odor of its waxy flowers, projecting like spearheads from bushes crowded among alders, which these shrubs resemble.

FLOWERS OF ROCKY PLACES

CONTINUED FROM 4660

MANY boys and girls are fortunate enough to live at the foot of some mountain. Some may even dwell in lonely farmhouses upon the slopes. These children have splendid chances for the study of wild flowers, for not only do the mountains provide many kinds such as we cannot find growing wild anywhere in the lowlands, but many of the lowland plants will also grow on the mountain-side. Some of the lowland plants will not grow at a greater height than a thousand feet above sea-level; and some mountain plants will not grow upon soil less than two thousand feet high and so on. On the other hand, we may find certain lowland plants growing at various heights.

The term "plants of rocky places" generally means, in America, those of hilly or mountainous country, as our beaches are chiefly sandy. They have no particular character, such as the fleshiness of maritime plants, except in the case of those growing upon the tops of high mountains. In such a position extremes of heat and cold have to be combated, drought is frequent, snow is often present near by, and the winds are terrific. Consequently only those plants, that, through the ages, have adapted themselves to these conditions, survive. One finds that, usually, these "alpine" plants (as those which grow on mountain tops above timber-line are called, whether in the Swiss Alps or not) are peculiarly dwarfed, spreading mat-like, in squat, tufted masses, but with brilliant flowers larger than the size of the plant would seem to call for. This compact form, combined with masses of bloom and a certain resistance to drought and to heat and cold, has made the alpine vegetation welcome to the gardener, who plants them on the tiny hillocks he erects in his rockery, and finds that they continue to thrive and bloom.

The low stature of the plants, and their close-set branches are, of course, the best form with which to resist the winds, and meet their other trials. A tall plant would soon be blown off, and the trees, and shrubs, as well as the herbs found high on mountains, are so dwarfed, twisted and contracted, as to seem quite unrelated to others of their kind growing at the base. As for their brilliantly-hued, large flowers, it is said that "on the heights above the tree-line there is actually no spring and no autumn, only a short summer following a long winter. All the flowers have therefore to blossom in this

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short time, and all the flower-visiting insects must do their flying about during the short period which is free from snow, if they do not wish to starve." Therefore, as soon as the snow is melted the flowers appear in every color, to allure the bees, butterflies and flies that depend upon their honey and pollen. By these means, the insects are satisfied, and in one way or another, they transfer pollen from the anthers of one flower to the pistil of another of the same kind.

There is one family which contains many of these alpine plants,—the Saxifrage family, the name meaning "stone-breaker" and given because the varieties so often spring out of cracks and pockets in cliffs, quite as if they had split the hard rocks to make room for themselves. But some of them, although growing on mountains of the Old World, belong to less elevated places in the New, especially in Northern Canada, where they may be found far up in the Arctic regions, where the climate is much like that of mountain peaks. Thence they sometimes follow the great, cool-topped mountain ranges into the United States, but, generally speaking, rarely occur south of Canada.

MOUNTAIN SAXIFRAGE GROWS NEAR MOUNTAIN RILLS

One such southward growing species is the yellow, or mountain saxifrage, that is found about the rock-rills that come down the mountain-sides, where its narrow, oblong leaves form large green cushions, a foot across. The flowering stems stand well above the cushions and bear a number of scattered flowers, whose yellow petals are dotted with red. The petals stand wide apart and the space is partly filled by the green sepals, upon each of which lies a golden stamen.

AN ORPINE WHICH HAS A ROSE-SCENTED ROOT

Another northern plant that is frequently cultivated is the rose-root, which is very closely allied to the saxifrages, but is included in that curious family of fleshy plants, the Orpines, which can flourish in the most unlikely dry and barren places, and which include the live-forever, and the stone-crop. This one, however, unlike most of its family, likes rocks dripping with moisture, and produces thick, fleshy stems, and thick, gray-green leaves that are flat, nearly round, and more than one inch across. Its little, waxy flowers are grouped in massive heads varying from yellow to purple in tint. Its branching root-stock, when broken, exhales an odor of roses.

THE PINK OR PURPLE FLOWERS OF THE MOSS-CAMPION

A low habit like that of the saxifrages is to be noticed in several of the Pink family when rooted upon rocks. One of these is the moss-campion, a plant that is only an inch or two high with slender awl-shaped leaves. The stems grow in dense spreading tufts that look much like a growth of bright green moss into which somebody has stuck a number of pink or pale purple flowers.

These flowers have no visible stalks, and although they are only half an inch across, they look so big in proportion to the leaves that they appear to have been plucked from some larger plant, and set among moss. They are of similar structure to the red campion and white campion of lowland fields and hedgerows. Like the other, it is most frequent in the far north, as is the taller mountain sorrel.

MOUNTAIN SORREL AND THE ALPINE MEADOW-RUE

This herb we shall not fail to recognize as one of the relations of the common sorrel of lowland fields, although its kidney-shaped leaves differ so much from the common kind. Its spray of flowers, however, allows us to make no mistake. Closely examined, they will be found to have only four sepals, while other sorrels and docks have six. It is not unlikely to be accompanied by the alpine meadow-rue, whose small leaves, with rounded leaflets in sets of three, are gathered into tufts. This herb does not look very much like the buttercups to whose family it nevertheless belongs, but closely resembles our other meadow-rues in its tossing tassels of stamens.

THE COLUMBINE PROVIDES THE HUMMING-BIRD WITH FOOD

Neither would the columbine suggest a buttercup, although a member of the latter's family, as it flaunts its jewel-like gold and scarlet flowers on rocky hillsides. Fitted as they are on slender stems, that are thrust out from tiny clefts in a rock-face, the columbines tremble in every whiff of wind, and send their yellow pollen flying, to alight on the outstanding pistils of other columbines. Nor are they neglected by insects, though only those with long tongues can reach up into the tips of the horns, where the honey-drops

THE BLADDERNUT

These are the quaint pouch-like fruits which give its name to the bladdernut,—a shrub which in spring shows us white flowers. The leaflets are in threes. They are mostly small trees, but ornamental.

THE PINK LADY'S SLIPPER

Velvety pink lady's slippers nod over sandy forest floors in early spring. The Greek name Cypripedium (or Venus' buskin), and the Indian one, "Moccasin-flower," both refer to the shoe-like form of the "lip."

THE MOSSY SAXIFRAGE

This is a wild flower of the mountains that is frequently grown in our gardens. It is picturesque with its erect shoots bearing white flowers, and is useful in a rock garden. The leaves are divided into lobes.

THE YELLOW MOUNTAIN SAXIFRAGE

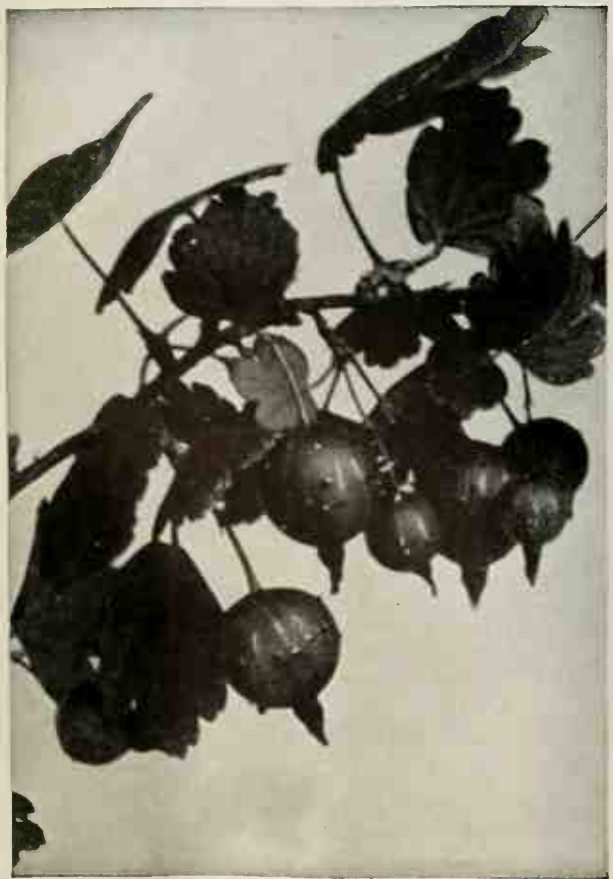
This is another of the saxifrages, many of which grow only in the mountain regions of the North and East. This plant is found in swamps and in wet places, and the flowers are yellow.

THE BILBERRY

The bilberry is a plant of many names, whortleberry, whinberry, and myrtleberry being most familiar. The leaves are egg-shaped, and the flowers, flesh-colored and wax-like, are found on hill and mountain.

THE ROSE-ROOT

The rose-root is found only in the mountainous districts of the North and in Ireland. It is a relation of the stonecrop. The flowers grow in a dense mass at the tops of the erect stems, and are usually yellow.



THE WILD GOOSEBERRY

The American wild gooseberry flourishes in rocky woods, rooted in the clefts of cliffs and ledges. Its berries look like those of the garden bush but are considerably smaller and more tart to the taste.

THE WILD SPIKENARD

The wild spikenard is one of the loveliest plants of our woods, its white, starry little flowers gleaming in the green shadows. In autumn they give place to the charming scarlet berries of the thickets.

THE GLOBE-FLOWER

This large and handsome plant belongs to the buttercup family. Its flowers are pale yellow, and grow into the form of a ball or globe, whence its name.

THE MOSS-CAMPION

This densely-tufted, mossy plant, with the pink and white flowers and the awl-shaped leaves, is found growing only on the summits of higher mountains.

THE NINEBARK

The ninebark has long drooping branches, often swaying down to the grass, in midsummer loaded with ball-like clusters of lovely little snow-white blossoms. It belongs to the fragrant rose family.

THE FLOWERING RASPBERRY

This gaudy bush shows itself a kind of raspberry, but its flowers alone might deceive one into thinking it a wild rose, to which family it belongs. Its fruit is more pretty than useful. It blooms late in summer.

THE BALSAM

The balsam, or jewel-weed, grows in mountain swamps. Its golden flowers quiver on slender stalks; the ripe seed-vessels open at the slightest touch, ejecting the seeds, whence another name — touch-me-not—and it bombards passers-by with pellets.

THE LONDON PRIDE

We know this plant, which grows wild on the mountains of Ireland, as the none-so-pretty, or St. Patrick's cabbage of the garden. The name London Pride is due to the fact that the plant thrives even in London, where soft-coal smoke ruins plant life.

THE SEA-PINK

The sea-pink, or thrift, is found on seashores and the tops of mountains. The fleshy leaves grow in dense tufts, and the rose-colored flowers in round clusters at the ends of the stalks. It often grows in gardens.

THE COMMON SCURVY-GRASS

The scurvy-grass is not a grass at all, but is a member of the cabbage family. It is a small plant with white flowers, and grows usually on muddy seashores, but it is also found on lofty mountains.

are. Humming-birds stab flower after flower, thrusting them back against the rock with their rapid assaults as they swiftly probe each spur. In the American species the horn-like spurs of the petals are not so strong and hooked as those of Europe, whose size gave rise to the quaint notion that they resembled the necks of doves billing across the stem; whence the name columbine from the Latin word *columba*, which means a dove.

THE BILBERRY OF THE NORTHERN MOUNTAINS

High on the northern mountain ranges of both hemispheres we find the great bilberry, a thick-leaved little shrub with blue-black, bloom-covered berries that the Scotch call bleaberry. It belongs to the Huckleberry family, is a near relative of our huckleberries and of the European whortleberry or myrtleberry, and looks very like them.

Its nearly closed, waxy, white or pinkish bells bend stiffly downwards, and when a bee clings to the flowers' opening, and pushes its tongue in to reach the nectar, its head is almost certain to push against the tails of the anthers; and the act, by tilting the tube of the anther and springing the tip, in which there is a chink, away from the pistil, allows a shower of pollen to fall upon the bee's face. We can see from the position of the pistil that when the bee visits the next flower, this pollen will be scraped off upon the stigma.

THE PALE-GREEN PRICKLY FRUIT OF THE WILD GOOSEBERRY

There is one little bush, easily recognized, for it closely resembles the cultivated gooseberry, and, in fact, is merely a wild species of gooseberry. It is apt to grow in shady woods, in pockets of the rocks, and often the slender branches, bent down by the weight of the pale-green spiked berries, droop from the ledges of high cliffs. It furnishes a tart, wild fruit for sweetmeats, more highly flavored than the tamer kinds, but more generous as to prickles, although these are somewhat softened by cooking.

THE FLOWERING RASPBERRY

Near the gooseberry, but on sunnier ledges, grows another scraggly, brittle-stemmed bush, bearing fruit quickly identified as raspberries,—but very dry and unpalatable raspberries. The whole shrub is furry in appearance. The great maple-like leaves are softly green and the crumpled, magenta-colored petals emerge from a collection of hairy sepals and stems. Even the bright scarlet, flattish, fruits are fuzzy. This is known as the flowering raspberry, and it blooms profusely during late summer, the flowers resembling those wild-roses in whose family the shrub is placed.

FLOWERS OF THE HONEYSUCKLE FAMILY BELOVED BY INSECTS

Several members of the tribe of honeysuckles, both upright shrubs and trailing vines, display themselves on our rough hillsides. One of the earliest plants to bloom is the fly-honeysuckle, with its pale yellow, twin flowers: much later comes the half-climbing, half-upright glaucous honeysuckle, with its close branches of honey-colored, green and purple-tinged flowers, very like those of the cultivated honeysuckles, but half hidden by the wide flaring cup formed beneath them by the union of the uppermost pair of leaves on the stalk.

On dry and rocky ledges, especially common on the islets of the St. Lawrence River, blooms the bush-honeysuckle, or diervilla, which has long-pointed, opposite leaves and yellow flowers very attractive to bees and other winged insects.

BLACKBERRIES LIKE TO GROW IN ROCKY, MARSHY PLACES

Some blackberries have adjusted themselves to life in hot sands, and creep valiantly under a blazing sun, bearing large white five petaled flowers like single roses, and, later, the succulent, pulpy fruit that we call dew-berries. But the tall blackberries prefer rocky, marshy soil where they can find water to swell their long luscious berries, not fully ripe until the birds begin to steal them. Brandy or cordial made from these berries is used in medicines.

THE CREAMY CLETHRA FLOWERS GIVE HONEY TO THE BEES

The clethra shrub is sometimes known as a sweet pepper bush or white alder. Although it grows generally among the ordinary alders at the edge of swamp or stream, one species inhabits mountains. The foliage is not unlike that of ordinary alders, but it is the long spikes of creamy-tinted, waxy, thick-petaled little flowers, heavily perfumed and yielding honey for bees, which render the clethra interesting.

THE NEXT NATURE STORY IS ON PAGE 4881.

ON THE ERIE CANAL IN THE EARLY DAYS

Before railroads became common, many passenger boats were built for the Erie Canal, and were very popular. This picture, made from a water-color of the time, shows the boat drawn by three horses going smoothly at the rate of four or five miles an hour, while the passengers talked, read or looked at the scenery. Sleeping quarters were arranged below.

Flourishing cities grew up along the canal and in several cases the canal is now bordered by high buildings and busy streets. Here we see boats loading and unloading in the heart of the city of Syracuse. Progress is necessarily slow, as many bridges bar the way and must swing aside or rise to allow the boats to pass. Many of the little towns along the canal added "port" to their names because of their location.

A Whole Fleet of Canal Boats Tied Up in Brooklyn.

THE ERIE CANAL

CONTINUED FROM 4743

BEFORE the steam engine was invented and railroads were built, cities and towns were chiefly found near the sea or along the rivers. The ancient nations that first became civilized inhabited regions about the big waters. Babylon was on the Euphrates, the Egyptians lived on the banks of the Nile, and the Greeks inhabited the islands and the shores of the Ægean Sea. England, surrounded by sea and watered by rivers, was the first country in Northern Europe to become densely populated.

The reason is simple. In those days water was the only practical means of long distance transportation. Manufacturing, even of a primitive kind, was impossible away from the water because the manufacturers could not ship their wares to the markets. For the same reason it did not pay the farmers to raise more produce than they themselves could consume. There were a few exceptions, such as the cattle raisers; they could drive their cattle to market over long distances. Their produce transported itself.

EARLY TRANSPORTATION BY WATER

The manufacturers and the farmers near the water could produce larger quantities, for they could load their wares and their produce on boats or ships, at comparatively little expense, and send them even to other countries. Consequently all manufacturers and farmers wanted to be near the water. It was trade that developed civilization, but it was water transportation that made trade possible.

Railroads have since changed these conditions. Without the railroads the interior of our vast country would still be wild prairie and forest. Freight cars serve on land as ships serve on the water, but water has not lost all of its old-time importance. Even to-day there are few really big cities far inland.

But at the time the American colonies had freed themselves from England, and for long afterwards, there was no thought of railways. Steam had not yet been put to practical use. The population of the new United States was then confined to the Atlantic seacoast and the river valleys. Boston, New York and Philadelphia had become the most important cities because they had protected harbors for shipping.

Meanwhile there had been some migration westward, through the wil-

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derness. The regions bordering on the shores of the Great Lakes and along the many rivers feeding them, consisted of low, rolling country, especially adapted to the raising of grains.

MEN LOOK TO THE WEST

Very early in the history of our country, there had been far-seeing men among the colonists who saw the tremendous advantages to the colonies that would follow establishing some means of transportation between the rich, agricultural regions west of the Alleghanies and the Atlantic seacoast. The lands along the coast were not adapted to wheat growing, yet the population needed wheat. With easy transportation, the farmers of the West would not only be able to supply this demand, but they would also be able to export their grains to Europe. Such a route would also render the wilderness between New York and the lake country habitable, for the settlers along the way would also be able to ship their produce to market.

George Washington, practical surveyor and engineer, was one of the first to have his imagination roused by these possibilities. He had explored the country between Albany on the Hudson and Buffalo on Lake Erie. Already much of this region was traversed by water routes. He became an enthusiastic advocate for connecting these waterways by canals, so that boats might pass from New York to the interior. To him it was not only a question of trade. If the sturdy settlers who had cleared their little homesteads in the Western wildernesses were not offered a means of communication with the states in the East, they would turn toward the power which held the Mississippi. Give them an outlet to the Atlantic coast and they would naturally maintain their allegiance to the States. To Washington and many others a waterway from the Great Lakes to the Hudson was necessary to develop a great, united nation.

Possibly it was only those of big, broad minds who saw it from this point of view. More numerous were the merchants and tradesmen of New York, who, for more selfish reasons, agitated the idea with much energy. They feared the commercial rivalry of Boston and Philadelphia. With Western grain, exported to Europe, passing through New York, that city would become the great trade centre of the country, its most important seaport. They finally compelled the state legislature to take action.

FIRST DISCUSSION OF A GREAT CANAL

In 1791 the legislature had ordered a survey made. Engineers were sent to study the country between Albany and Lake Erie and report on the possibility of digging a through waterway between those two points. Their report was warmly in favor of the undertaking. And so the first actual step was taken toward the digging of the Erie Canal.

Travelers of that period have left interesting records of the difficulties to be encountered on the way. From New York City they journeyed from two to five days on sailing boats up to Albany, thence overland seventeen miles to Schenectady. Here they embarked again on boats, propelled by oars and sail, and sometimes, over shallow stretches, by means of poles. After traveling 104 miles in this fashion, at the rate of about twenty miles a day, they would reach Utica, a small, log hut settlement. Another nine days' journey by water and land brought them to Oswego, on Lake Ontario. Naturally very little merchandise was sent over this route, but such as was sent cost $100 a ton, or more, for freight.

PRIVATE INDIVIDUALS FAIL TO DIG A CANAL

At first the state attempted to encourage private companies to undertake the vast work of cutting through the waterway. Some were organized and even began work; short sections of canal were dug, connecting some of the various rivers and lakes on the way. But in those days there were few rich men and it was found impossible to raise enough capital to finance the whole undertaking.

One of the most enthusiastic advocates of the scheme was Gouverneur Morris, then representing New York in the United States Senate. "Some day," said he, "ships will sail from London bound for Buffalo, via the Hudson River." It was he who interested DeWitt Clinton in the idea, the man whose determination and energy was yet to bring it to a complete realization.

It was nearly twenty years after the first survey had been made before the state again took action. By this time it was obvious that the private companies could not accomplish much. So, in 1810,

the Legislature appointed a canal commission to go to Washington and lay the matter before the President and Congress. As George Washington had already said years before, an Erie Canal was of great national importance; it would unite the nation; the East with what was then the West. The cost had been estimated at five million dollars. Private capitalists could not subscribe such an amount, but surely Congress could appropriate such a sum for a work of such importance.

DE WITT CLINTON AND THE ERIE CANAL

But in those days Congress did not make five million dollar appropriations so readily as it does now. There was much discussion and powerful opposition. Then came the War of 1812, and the Federal Government had other matters to which it must devote its energy and funds. It was then that DeWitt Clinton began publicly to agitate the digging of the canal. And finally, in 1816, the governor of New York appointed a new canal commission, authorized to raise a loan which would be guaranteed by the state. At the head of this commission the governor placed De Witt Clinton.

To test the interest of the people of the state in the canal scheme, Clinton made it a political issue; in the following year, 1817, he became a candidate for governor, promising that if he were chosen he would make the digging of the canal his chief business. And he was elected, by one of the biggest majorities that ever put an official into office. On July 1st he was inaugurated. Three days later, on Independence Day, he went up to Rome, on the Mohawk River, attended by his staff; and began the digging of the canal by turning up the first shovelful of earth.

According to the plans, the canal was to be forty feet wide at the top, twenty-eight feet at the bottom and four feet deep. The cost would be about five million dollars. It was the size of the work that was most remarkable; as a feat of engineering skill it was then unusual, but, when compared with the great works that are undertaken in the present time, it was not especially difficult.

Yet there were many supposedly well educated people in those days who thought the Erie Canal a wild dream. "You cannot make water run uphill," they said, though the theory of locks, by means of which barges could be lifted to higher levels, had already been put into practice in canals abroad. The digging began. In two years a section fifteen miles in length was finished, connecting Rome with Utica. The next year the canal reached the Seneca River.

WHEN THE CANAL WAS FINALLY COMPLETED

DeWitt Clinton had said that the work would be completed in 1823, but this promise was not fulfilled. It went more slowly than had been expected. His political enemies made the most of this in the next gubernatorial campaign. In spite of this he had been re-elected to a second term, but by a very slender majority. Plainly the people were growing discouraged with the slow progress of the canal work. At the next election, in 1822, Clinton had not even been nominated as a candidate. His opponents came into office, though he remained the head of the canal commission. And then the governor removed him from that office, which he had held since 1810, even while governor. His enemies, those who had been against the canal from the beginning, a political ring known as the "Albany Regency," seemed to have triumphed. After this humiliation it was thought that Clinton's public career was ended.

But the man who had transformed talk into action was not to be overcome so easily. Under the Albany Regency the work on the canal almost came to a standstill. This caused even more dissatisfaction than the slow progress. So two years later, in 1824, Clinton found himself with enough friends to be nominated as candidate for governor once more. And when the election came around he was again put into office by a great majority. Once more in office and at the head of his old canal commission, he began pushing the work with renewed energy. And a year later, October 26, 1825, the work was completed and the opening ceremony was celebrated.

CEREMONIES WHEN THE CANAL WAS COMPLETED

The first boat to enter the canal at Buffalo was the Seneca Chief, a luxurious passenger packet. On board were Governor Clinton, his family, his friends and his official staff. A team of four powerful gray horses hauled it along, and as they began treading the towpath, a

cannon at the entrance of the canal announced the official opening. A minute later another cannon boomed forth, some miles away, then a third, far off in the distance, almost beyond hearing.

These cannon were the first of a series of several hundred cannon, stationed at intervals along the canal, reaching down along the Hudson to New York, each barely within sound of the other. And so the news of the opening was flashed down to New York, as fast as sound could travel, passing down the line in one hour and twenty minutes.

Following the Seneca Chief into the canal came a procession of barges, each gaily decorated with flags and flowers, crowded with people. One, called Noah's Ark, carried as passengers a bear, two fawns, two eagles, two raccoons and two Indians. And so the procession continued along the canal toward Albany. All along the route it was met with music and cheering crowds of farmers, most of whom had settled in anticipation of the benefits they would derive from the canal.

At Albany the barges were greeted with the booming of cannon, a grand military procession and a citizens' parade. Here the flotilla of barges glided into the Hudson and began its journey down the river to New York. The Washington, a new steamer, one of the first afloat on the Hudson, came up to meet them. "Where are you from and whither bound?" it signaled.

"From Lake Erie, bound for Sandy Hook," replied the Seneca Chief.

The Washington and the Seneca Chief leading, the procession continued, passed New York to the sound of ringing bells and booming cannon and continued down the harbor toward the Narrows. The journey from Buffalo had taken just nine days.

THE WATERS OF LAKE ERIE MINGLE WITH THE OCEAN

Outside the Narrows the flotilla paused. Then the governor lifted a keg, containing water from Lake Erie, which he poured into the Atlantic Ocean, to signify the union of the two waters. Another keg, containing a mixture of waters from all the great rivers of the world, from the Ganges, the Thames, the Nile, the Amazon, was also poured over, to indicate that the commerce from all parts of the world would now pass that way. As the governor pronounced the official address tears streamed from his eyes. For twenty years he had talked and worked for the canal, at times apparently on the verge of failure. Now he had triumphed.

The celebration that welcomed the governor and his companions in New York City exceeded anything of the kind that had ever taken place before. Military and citizens' parades thronged the streets. All the trades were represented, the fire department leading. Heading the marching printers was a wagon carrying a printing press. And as the procession marched, the press turned out leaflets bearing the printed verse:

" 'Tis done! 'Tis done! The mighty chain
Which joins bright Erie to the Main,
For ages shall perpetuate
The glories of our native state."

The Erie Canal more than realized the expectations of those who had advocated its construction years before. Even as a mere business enterprise it proved a success from the beginning. In 1825, the year in which the work was completed, the tolls collected along the finished part of the route amounted to over half a million dollars. Five years later, in 1830, the state collected a million dollars in tolls. By the end of 1837, only twelve years after it had been opened, the Erie Canal had paid fifteen million dollars into the treasury, which was more than the cost of digging and maintaining it in repair combined.

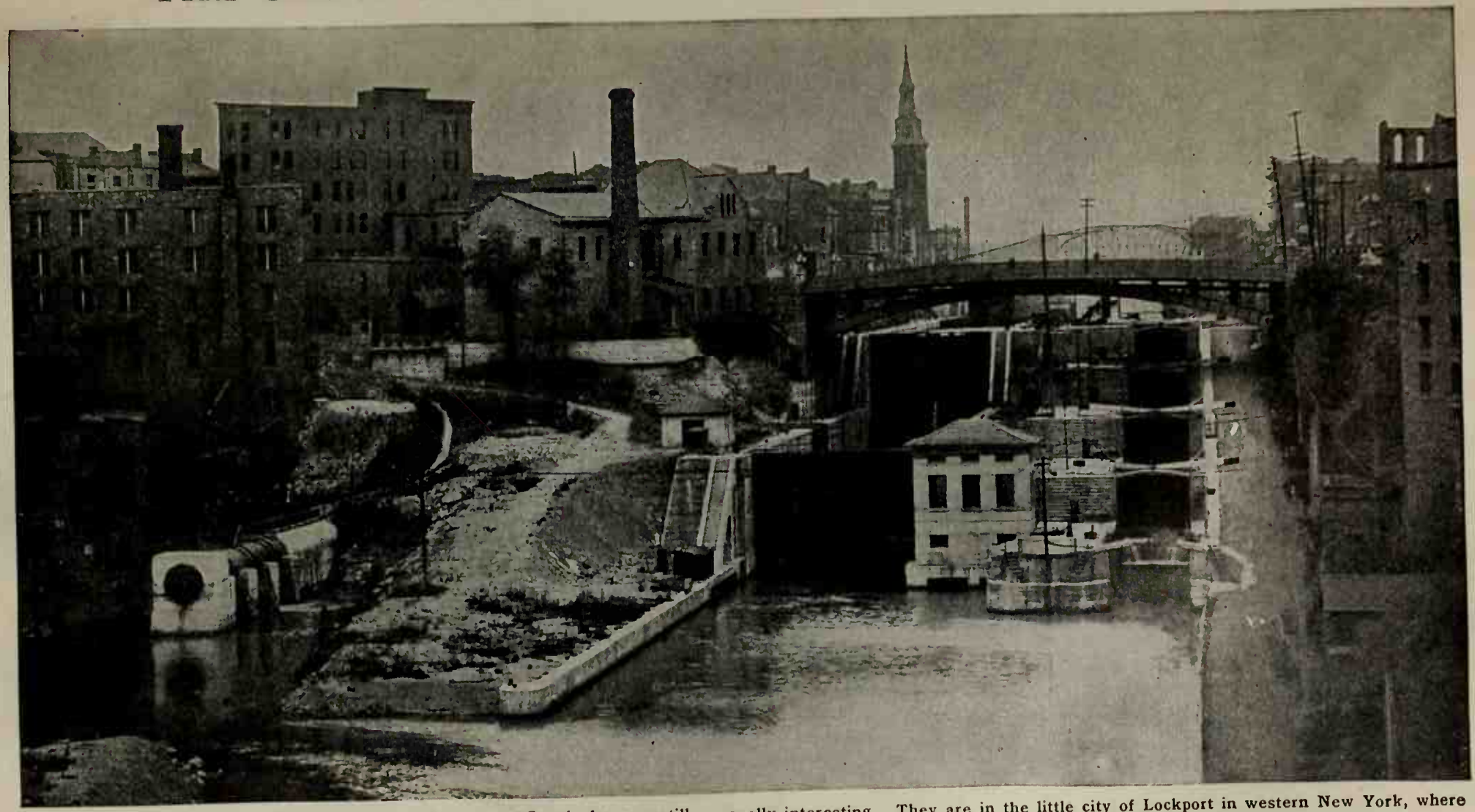
WHAT THE CANAL DID FOR NEW YORK CITY

For the business interests of New York it had done even more. In 1824, the year before traffic was opened along the whole canal, it cost $88 to send a ton of freight from Buffalo to Albany. Eleven years later, in 1835, it cost only three dollars. This meant that the people of New York and up and down the coast could get their bread so much cheaper. It also enabled the poor people of Europe to get their bread cheaper, for now vast quantities of wheat were shipped down the canal and exported to Europe. Over half of all the wheat exported from America to Europe came by this route. It was the Erie Canal which made New York the biggest business centre on the Atlantic Coast, the most important seaport in the country.

HOW THE CANAL HELPED THE STATE

With a navigable waterway traversing it, it was only natural that New York

THE GREAT LOCKS OF THE ERIE CANAL AT LOCKPORT



While these locks are not so large as those of the Panama Canal, they are still unusually interesting. They are in the little city of Lockport in western New York, where the land descends toward the level of Lake Erie. These, however, are not the largest on the canal. At Little Falls is the highest lock in the world, and at Waterford is a set of five, which together raise or lower the boats the immense distance of 184 feet. The total lift of the Panama locks is not half so much.

State should develop. What was once a wilderness, through which the early settlers had passed to reach the Great Lakes region, now became covered with prosperous farming communities. Even before the canal was completed the immigrants had arrived to lay out their homesteads, in anticipation of the produce they would be able to raise for the New York, Boston and Philadelphia markets.

Already while the canal was being dug there was talk of wagons that should run on iron rails, drawn by steam engines, and in 1831 a railroad was actually built from Albany to Schenectady, a distance of seventeen miles. Ten years later the railroad had been extended to Buffalo. But the railroads did not have any great effect on the traffic on the canal. For the reason that it costs so much to build and maintain railroads and freight cars, water transportation is, and always will be, cheaper.

THE CANAL WAS WIDENED AND DEEPENED

It is usually said that the Erie Canal was completed in 1825. But that is not quite true. It is not yet completed. Within ten years there was more freight than the canal barges could handle. Branches reaching out into other districts were continually being dug, until there were over a thousand miles of canal. Then the main canal was widened to 70 feet, so that barges large enough to carry eight thousand bushels of wheat could pass, instead of only one thousand bushels.

It was not long before the railroad companies began to show a bitter opposition toward the canal. Naturally, the canal forced them to keep down their freight rates. In every way they could they tried to impede any improvements on what they called the "ditch." Through their efforts a law was passed abolishing tolls. Apparently this would make freight rates cheaper on the canal. And so it did. But it also abolished the source of revenue from which improvements could be made. This obliged the legislature to appropriate special sums of money for the purpose. And this again raised a strong sentiment against the canal among those who did not benefit directly from it and felt they were being taxed for the good of those who lived along its route. The consequence was that the canal was neglected.

AGAIN THE CANAL WAS IMPROVED

But finally, in 1903, the people awoke to the realization that the railroads were opposed to the canal only for reasons of self-interest. And then amends were made for the many years of neglect. The people voted in favor of spending over one hundred million dollars to build what may be said to be a new canal, but a modern one, along which steamers may sail as they do up and down the Hudson. The new canal follows, for the most part, the line of the old, but many miles have been relocated for several different reasons.

The system of locks along the new Erie Canal surpasses even the Panama locks. In a dry, sloping pasture behind the little town of Waterford, the engineers have built what looks like a flight of giant steps, huge, concrete blocks, in each of which is one of five locks. Combined they will lift the freight steamers 184 feet, which is fourteen feet higher than all the Panama locks combined. At Little Falls, where the new channel of the canal ascends a narrow ravine, there is one lock, the highest in the world, which will lift the steamers something over forty feet in eight minutes, as though they were being hoisted by a giant derrick.

SOME WONDERFUL FEATURES OF THE WORK

Another wonderful feature is the great movable dams, big steel girders and steel plates riveted together, which are hinged on gigantic bridgelike structures. When navigation ceases in the winter these dams will be swung up so that the ice floes may sweep down unimpeded. There are eight of these great dams, and each cost $300,000.

The barges which are to take the place of the old horse-hauled craft are of 2000 to 3000-ton burden, compared to the 250-ton burden of the old barges. Some will be able to carry the contents of a freight train of seventy-five cars. That is the size of an average ocean-going freight steamer. And being propelled by their own power, these modern freight carriers will be able to carry their cargoes from Buffalo to New York two and a half times faster than did the old barges; the trip will be covered in a few days. Perhaps freight may be carried more quickly than it now is by train.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 5007

A BORDER BALLAD BY SIR WALTER SCOTT

THE ballad is, of all forms of poetry. that best suited to the telling of a direct dramatic story. Sir Walter Scott, whose poems have the same romantic interest as his great novels, wrote a long romance in poetry entitled "Marmion: A Tale of Flodden Field." In the course of that long work several ballads are introduced. "Lochinvar" is one of these, and it is supposed to be sung by Lady Heron at Holyrood Palace, where King James is making merry, while Queen Margaret, at Linlithgow Castle, imagines he is engaged in battle against the English. The ballad is a very spirited love story of the kind we all admire, for Lochinvar, who snatched his true love away before the very eyes of the man to whom she was on the point of being married, is the ideal hero of romance. The scene of the story is the Scottish Borderland, and the idea was probably derived to some extent from an old ballad.

YOUNG LOCHINVAR

CONTINUED FROM 4722

OH, young Lochinvar is come out of the West
Through all the wide Border his steed was the best;
And save his good broadsword he weapon had none;
He rode all unarm'd and he rode all alone.
So faithful in love, and so dauntless in war,
There never was knight like the young Lochinvar!

He stay'd not for brake and he stopp'd not for stone;
He swam the Eske river where ford there was none;
But ere he alighted at Netherby gate,
The bride had consented; the gallant came late;
For a laggard in love and a dastard in war,
Was to wed the fair Ellen of brave Lochinvar.

So boldly he enter'd the Netherby Hall,
'Mong bridesmen and kinsmen and brothers and all.
Then spake the bride's father, his hand on his sword,
For the poor craven bridegroom said never a word,
"Oh, come ye in peace here, or come ye in war,
Or to dance at our bridal, young Lord Lochinvar?"

"I long woo'd your daughter, my suit you denied;
Love swells like the Solway, but ebbs like its tide;
And now I am come with this lost love of mine
To lead but one measure, drink one cup of wine.
There are maidens in Scotland more lovely by far,
That would gladly be bride to the young Lochinvar!"

The bride kiss'd the goblet, the knight took it up,
He quaff'd off the wine and he threw down the cup;
She look'd down to blush, and she look'd up to sigh,
With a smile on her lip and a tear in her eye.
He took her soft hand ere her mother could bar;
"Now tread we a measure!" said young Lochinvar.

So stately his form, and so lovely her face,
That never a hall such a galliard did grace:
While her mother did fret and her father did fume,
And the bridegroom stood dangling his bonnet and plume;
And the bride-maidens whispered: "'Twere better by far
To have match'd our fair cousin with young Lochinvar!"

One touch to her hand and one word in her ear,
When they reach'd the hall-door; and the charger stood near;
So light to the croup the fair lady he swung,
So light to the saddle before her he sprung!
"She is won! We are gone, over bank, bush and scaur,
They'll have fleet steeds that follow!" quoth young Lochinvar.

There was mounting 'mong Græmes of the Netherby clan;
Forsters, Fenwicks, and Musgraves, they rode and they ran;
There was racing and chasing on Cannobie Lea;
But the lost bride of Netherby ne'er did they see.
So daring in love, and so dauntless in war,
Have ye e'er heard of gallant like young Lochinvar?

THE MARSEILLAISE

This is one of the grandest songs of liberty that has ever been written. It is the national anthem of the French Republic. But it is something more, for wherever men are striving against oppression and striking for freedom, "The Marseillaise" is adopted as their hymn. It is indeed the anthem of liberty all the world over. It was originally written in French by Captain Rouget de Lisle, a French officer at Strasburg, in 1792, and was called "The Hymn of the Army of the Rhine," being written and set to music by the captain for the soldiers of the Rhine army to sing as they marched along. But because it was made known in Paris by the soldiers who came from Marseilles it was called "The Marseillaise," and has ever since borne that title. These soldiers from the south of France were the most enthusiastic fighters in the great days of the French Revolution, and as they adopted the song, which, with its stirring words and equally stirring music, had soon fired the hearts of the French people, it became the national anthem of the Republic.

YE sons of France, awake to glory,
Hark, hark, what myriads bid you rise,
Your children, wives, and grandsires hoary,
Behold their tears and hear their cries!
Shall hateful tyrants, mischief breeding,
With hireling hosts, a ruffian band,
Affright and desolate the land,
While peace and liberty lie bleeding?

Refrain.

To arms, to arms, ye brave!
Th' avenging sword unsheath!
March on, march on, all hearts resolved
To victory or death.

Now, now the dangerous storm is scowling
Which treacherous kings, confederate, raise;
The dogs of war, let loose, are howling,
And, lo! our fields and cities blaze.
And shall we basely view the ruin,
While lawless force, with guilty stride,
Spreads desolation far and wide,
With crimes and blood his hands embruing?

With luxury and pride surrounded,
The vile, insatiate despots dare,
Their thirst of power and gold unbounded,
To mete and vend the light and air;
Like beasts of burden would they load us,
Like gods would bid their slaves adore:
But man is man, and who is more?
Then, shall they longer lash and goad us?

O Liberty, can man resign thee!
Once having felt thy gen'rous flame?
Can dungeon, bolts, and bars confine thee,
Or whips thy noble spirit tame?
Too long the world has wept, bewailing
That falsehood's dagger tyrants wield;
But freedom is our sword and shield,
And all their arts are unavailing.

THE OWL

If we look back at page 2929, we shall find a song from Shakespeare beginning "When icicles hang by the wall," and it will be seen that Lord Tennyson in the following lines on the owl has to some extent modeled his verse on Shakespeare's.

WHEN cats run home and light is come,
And dew is cold upon the ground,
And the far-off stream is dumb,
And the whirring sail goes round,
And the whirring sail goes round;
Alone, and warming his five wits,
The white owl in the belfry sits.

When merry milkmaids click the latch,
And rarely smells the new-mown hay,
And the cock hath sung beneath the thatch
Twice or thrice his roundelay,
Twice or thrice his roundelay;
Alone, and warming his five wits,
The white owl in the belfry sits.

THE CROCUS

In the country the first hint that people get of the coming of spring is the appearance of the crocus in its gay dress. When the garden looks to the eye as if it were still under the power of winter, they are suddenly surprised to see a globe of gold, or purple, or white, light up the soil, and they know then that warmer spring days are at hand. The interesting stranger is the crocus, to which Mrs. Harriet E. King pays so true and fitting a tribute in her poem.

OUT of the frozen earth below,
Out of the melting of the snow,
No flower, but a film, I push to light;
No stem, no bud—yet I have burst
The bars of winter. I am the first,
O sun, to greet thee out of the night!

Bare are the branches, cold is the air,
Yet it is fire at the heart I bear,
I come, a flame that is fed by none:
The summer hath blossoms for her delight,
Thick and dewey and waxen-white.
Thou seest me golden, O golden sun!

Deep in the warm sleep underground
Life is still, and the peace profound:
Yet a beam that pierced, and a thrill that smote,
Call'd me and drew me from far away—
I rose, I came, to the open day.
I have won, unshelter'd, alone, remote.

No bee strays out to greet me at morn,
I shall die ere the butterfly is born,
I shall hear no note of the nightingale;
The swallow will come at the break of green,
He will never know that I have been
Before him here when the world was pale.

They will follow, the rose with the thorny stem,
The hyacinth stalk—soft airs for them;
They shall have strength, I have but love:
They shall not be tender as I—
Yet I fought here first, to bloom, to die,
To shine in his face who shines above.

O Glory of Heaven, O Ruler of Morn,
O Dream that shap'd me, and I was born
In thy likeness, starry, and flower of flame;
I lie on the earth, and to thee look up,
Into thy image will grow my cup,
Till a sunbeam dissolve it into the same.

UP-HILL

These impressive verses by Christina Rossetti are in praise of high endeavor. We are to set our faces to the up-hill journey of life, and, nothing daunted, press forward through the long day, assured of the great reward of rest at the end.

DOES the road wind up-hill all the way?
Yes to the very end.
Will the day's journey take the whole long day?
From morn to night, my friend.

But is there for the night a resting-place?
A roof for when the slow dark hours begin.
May not the darkness hide it from my face?
You cannot miss the inn.

Shall I meet other wayfarers at night?
Those who have gone before.
Then must I knock, or call when just in sight?
They will not keep you standing at the door.

Shall I find comfort, travel-sore and weak?
Of labour you shall find the sum.
Will there be beds for me and all who seek?
Yes, beds, for all who come.

LOVE WILL FIND OUT THE WAY

OVER the mountains
And over the waves,
Under the fountains
And under the graves,
Under floods that are deepest
Which Neptune obey,
Over rocks that are steepest,
Love will find out the way.

Where there is no place
For the glow-worm to lie;
Where there is no space
For receipt of a fly;
Where the midge dares not venture
Lest herself fast she lay,
If Love come, he will enter
And will find out the way.

OLD ENGLISH.

"SHIPS THAT PASS IN THE NIGHT"

SHIPS that pass in the night and speak each other in passing,
Only a signal shown and a distant voice in the darkness;
So on the ocean of life, we pass and speak one another,
Only a look and a voice, then darkness again and a silence.

—HENRY WADSWORTH LONGFELLOW.

THE LESSON OF THE WATER MILL

We have already had the pleasure of reading, on page 2745 a fine poem by Miss Sarah Doudney. In the following poem she weaves a lesson around the old proverb, "The mill will never grind again with the water that is passed."

LISTEN to the water mill
Through the livelong day,
How the clicking of the wheel
Wears the hours away!
Languidly the autumn wind
Stirs the forest leaves;
From the field the reapers sing,
Binding up their sheaves.
And a proverb haunts my mind
As a spell is cast—
"The mill cannot grind
With the water that is past."

Autumn winds revive no more
Leaves that once are shed,
And the sickle cannot reap
Corn once gatherèd.
Flows the ruffled streamlet on,
Tranquil, deep, and still,
Never gliding back again,
To the water mill,
Truly speaks that proverb old,
With a meaning vast—
"The mill cannot grind
With the water that is past."

Take the lesson to thyself,
True and loving heart;
Golden youth is fleeting by,
Summer hours depart.
Learn to make the most of life,
Lose no happy day,
Time will never bring thee back
Chances swept away!
Leave no tender word unsaid,
Love while love shall last—
"The mill cannot grind
With the water that is past."

Work while yet the daylight shines,
Man of strength and will!
Never does the streamlet glide
Useless by the mill;
Wait not till to-morrow's sun
Beams upon thy way,
All that thou canst call thine own
Lies in thy "to-day."
Power, and intellect, and health
May not always last—
"The mill cannot grind
With the water that is past."

O the wasted hours of life
That have drifted by!
O the good that might have been,
Lost, without a sigh!
Love that we might once have saved
By a single word,
Thoughts conceived, but never penned,
Perishing unheard;
Take the proverb to thine heart,
Take, and hold it fast—
"The mill cannot grind
With the water that is past."

THE CRY OF THE DREAMER *

John Boyle O'Reilly was an Irish author who won distinction in America, where he died in 1890, at the early age of forty-six. He was a true poet, and one who hated the meaner aspects of modern life. In these fine verses this aspect of his character may be seen, for he was one of the dreamers who, by virtue of their serene and beautiful thoughts, can never die.

I AM tired of planning and toiling
In the crowded hives of men;
Heart weary of building and spoiling,
And spoiling and building again.
And I long for the dear old river,
Where I dreamed my youth away;
For a dreamer lives for ever
And a toiler dies in a day.

I am sick of the showy seeming
Of a life that is half a lie;
Of the faces lined with scheming
In the throng that hurries by.
From the sleepless thoughts' endeavour
I would go where the children play;
For a dreamer lives for ever,
And a toiler dies in a day.

I can feel no pride, but pity
For the burdens the rich endure;
There is nothing sweet in the city
But the patient lives of the poor.
Oh! the little hands too skilful,
And the child mind choked with weeds!
The daughter's heart grown wilful,
And the father's heart that bleeds!

No, no! From the street's rude bustle,
From trophies of mart and stage,
I would fly to the wood's low rustle
And the meadow's kindly page.
Let me dream as of old by the river,
And be loved for the dream alway;
For a dreamer lives for ever,
And a toiler dies in a day.

* By special permission of the publishers, The Bobbs-Merrill Co.

*THE BRAVEST BATTLE THAT EVER WAS FOUGHT

Joaquin Miller was one of the most picturesque figures in American literature. He was born in Indiana in 1841, and in his earlier life had many adventures, finally settling in California in 1887. He is the singer of the great lands of the West known as the Sierras, and most of his poetry suggests very effectively the splendid freedom and breadth of view of these great spaces of the mighty continent. In the piece we have chosen here, however, he sings in praise of the best of all heroines, the toiling mothers of our race.

THE bravest battle that ever was fought,
Shall I tell you where and when?
On the maps of the world you will find it not;
'Twas fought by the mothers of men.

Nay, not with cannon, or battle-shot,
With sword, or nobler pen;
Nay, not with eloquent word or thought,
From mouths of wonderful men.

But deep in a walled-up woman's heart—
Of woman that would not yield,
But bravely, silently bore her part—
Lo! there is that battle-field!

No marshalling troop, no bivouac song;
No banners to gleam and wave!
But oh! these battles they last so long—
From babyhood to the grave!

Yet faithful still as a bridge of stars,
She fights in her walled-up town—
Fights on, and on, in the endless wars,
Then silent, unseen goes down!

Oh! ye with banners and battle-shot
And soldier to shout and praise,
I tell you the kingliest victories fought
Are fought in these silent ways!

Oh! spotless woman in a world of shame,
With splendid and silent scorn,
Go back to God as white as you came,
The kingliest warrior born.

A DEED AND A WORD

Dr. Charles Mackay sings an old, old song in these verses,—an old song that is ever new, for the lessons of mercy and kindly consideration to our fellows need ever to be read to us, lest in too much thought of ourselves we forget how we may help others by some kind action which is free from all self-interest.

A LITTLE stream had lost its way
Amid the grass and fern;
A passing stranger scooped a well,
Where weary men might turn.
He walled it in, and hung with care
A ladle at the brink;
He thought not of the deed he did,
But judged that all might drink.
He passed again, and lo! the well,
By summer never dried,
Had cooled ten thousand parching tongues,
And saved a life beside.

A nameless man amid a crowd
That thronged the daily mart,
Let fall a word of hope and love,
Unstudied, from the heart;
A whisper on the tumult thrown,
A transitory breath—
It raised a brother from the dust,
It saved a soul from death.
O germ! O fount! O word of love!
O thought at random cast!
Ye were but little at the first,
But mighty at the last.

A MAN'S A MAN FOR A' THAT

Few of the songs of Robert Burns are more popular than this, although so many of its words are unfamiliar to American readers. It is a great lyric in praise of the honest poor man, who is not ashamed of being poor, and apes not the manners of those who are better provided with worldly goods. It is a wholesome reminder to us that titles and dignities are no more than artificial distinctions, and it is the man himself, by his own character and his own deeds, who can prove himself worthy or unworthy of the honor and esteem of his fellow-men. There is a piece of gold, which represents the character of a good man, and there is a guinea which has been stamped out of gold; this is all the difference that rank and title can make. "The man is the gold for all that," to put the words of the poet into English.

IS there, for honest poverty,
That hangs his head, and a' that?
The coward-slave, we pass him by,
And dare be poor, for a' that!
For a' that, and a' that,
Our toils obscure, and a' that,
The rank is but the guinea's stamp;
The man's the gowd for a' that.

What tho' on hamely fare we dine,
Wear hodden-gray, and a' that;
Gie fools their silks, and knaves their wine,
A man's a man for a' that.
For a' that, and a' that,
Their tinsel show, and a' that,
The honest man, tho' ne'er sae poor,
Is king o' men for a' that.

Ye see yon birkie, ca'ed a lord,
Wha struts, and stares, and a' that;
Tho' hundreds worship at his word,
He's but a coof for a' that.
For a' that, and a' that,
His riband, star, and a' that,
The man of independent mind,
He looks and laughs at a' that.

A king can mak a belted knight,
A marquis, duke, and a' that;
But an honest man's aboon his might,
Guid faith, he maunna fa' that!
For a' that, and a' that,
Their dignities, and a' that,
The pith o' sense, and pride o' worth,
Are higher rank than a' that.

Then let us pray that come it may,
As come it will for a' that,
That sense and worth, o'er a' the earth,
May bear the gree, and a' that.
For a' that, and a' that,
It's coming yet, for a' that,
When man to man, the warld o'er,
Shall brothers be for a' that.

FINIS

"Finis" is a Latin word, and means "end." The thoughts uttered in these four lines, therefore, are Walter Savage Landor's summing up of his career. He strikes a note of strength, of intense confidence in himself; but a selfish note is not wholly pleasant. His devotion to Nature and art, however, excuse much. His pride deceived him, too, for he was almost a born fighter, whether his opponents or the causes for which they stood were worthy of his strife or not. The picture of the old man warming both hands at life's fire and being then ready to go to his long sleep is ranked among the greatest strokes of imagination in English poetry.

I STROVE with none, for none was worth my strife.
Nature, I loved, and next to Nature, art.
I warm'd both hands before the fire of life;
It sinks, and I am ready to depart.

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SHOCK-HEADED PETER

HALF a century or more ago there were not many amusing books for children, and a German physician, Dr. Hoffman, being unable to find the kind of volume he wanted for his little boy, bought a plain notebook, and from time to time wrote short rhymes in the pages and drew little pictures to illustrate them. The rhymes were mostly about disobedient and foolish boys and girls, but they greatly pleased Dr. Hoffman's little son and delighted even grown-up people, who persuaded the doctor to publish them. These amusing rhymes, beginning with that of "Shock-headed Peter," became very popular, and have now been translated into nearly every European language. A selection of Dr. Hoffman's verses is given on these pages.

SHOCK-HEADED PETER

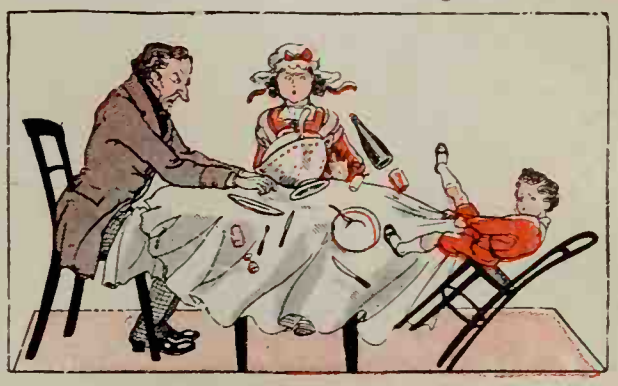
BEHOLD Shock-headed Peter,
This dreadful-looking creature!

He wouldn't let them cut his hair,
Or nails from off his fingers pare,
For nigh the span of one full year.
His friends, whene'er his name they hear,
Cry: "Ugh! You dirty creature!
Horrid Shock-headed Peter!"

THE STORY OF FIDGETY PHILIP

"I OFTEN wonder if our Phil
Will learn at table to sit still?"
His father's voice was very grave,
As he warned him to behave.

His mother looked with silent gaze
Around the table in amaze.
Philip no attention paid
To what his loving father said.
He wriggled and jiggled,
He see-sawed and he-hawed,
Forward and backward he tilted his seat·
"Stop it, Philip, I do entreat!"
See him on his chair just hang,
Soon he'll go down with a bang.
The chair will slip with Philip's weight,
Because the see-saws are too great.



Back goes his chair and down he falls,
It mattered not his frightened squalls.
Nothing can his fall prevent,
But, snatching at the cloth, he sent
Flying every dish and plate.
His father's wrath was very great,
And his mother mutely gazed
Round the table quite amazed.
Phil has gone down with his chair,
The table's left quite clear and bare.
Not a scrap is left to eat.
Soup, potatoes, bread, and meat,
Every glass and dish and bowl,
Wildly on the floor did roll.

Father Jackson and his wife
Never saw in all their life
Such a mess as this before.
They looked with wonder at the floor,
Where, destroyed, lay all their food,
And their tempers were not good.

THE HUNTER AND THE HARE

ONE hot summer day a hunter went out,
For big game and little in green fields to scout;
With powder-horn, game-bag, and very long gun,
He walked in his grassy green coat in the sun.

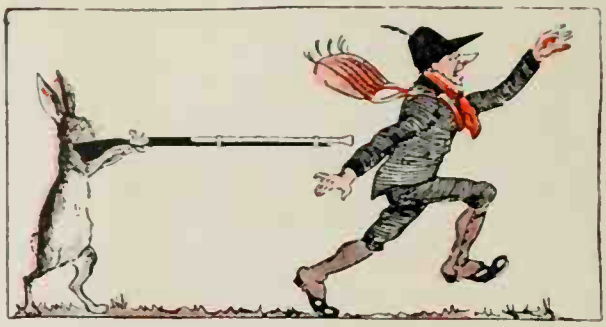
Placing his spectacles straight on his nose,
"I'll just shoot a hare," he says as he goes.
A little hare sat in his house cool and green,
And laughed as the hunter passed by him unseen.

The air was so hot, and so dusty the road,
The gun to the hunter seemed quite a big load,
So wearily down on the flat of his back,
He lay and went off to sleep in a crack.

As soon as he thought the hunter asleep,
The little hare to him softly did creep
He took the man's gun and his glasses away,
Then quickly ran off, saying: "No need to stay."

The glasses he put upon his own nose,
And said: "I see much better now, I suppose."

He raised the long gun, aimed at the coat green,
But ere he could fire, by the hunter was seen.



The hunter jumped up and shouted, dismayed:
"Oh, help me, dear people, I'm dead, I'm afraid!"
He ran for dear life, no man heard his yell;
Chased close by the hare, he jumped into a well.

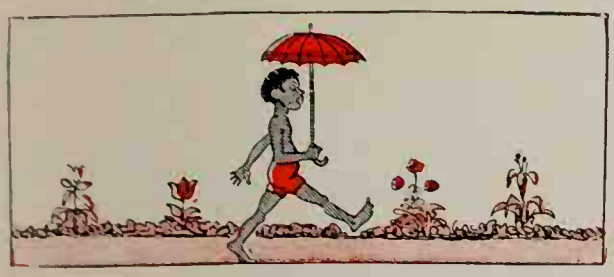
The little hare fired, and bang went the gun.
He misses his aim, but what has he done?
The hunter's young wife at the house window sat,
Enjoying her tea with her favourite cat.

She raised to her lips the tea for to sup,
When whizz came the bullet—in two broke the cup.
And just at this moment, without fear or care,
Under the window danced another small hare.

On him dropped the tea—the picture it shows,
Drenching his ears, and his eyes, and his nose.
Affrighted he leaps. "What burns me?" he said,
And when last was seen whirled the spoon round his head.

THE STORY OF A BLACKAMOOR

HERE in this picture you can see
A Moor, as black as coal is he.

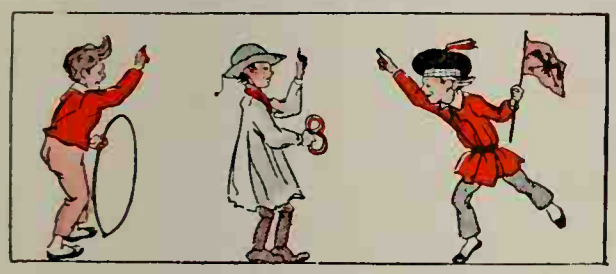


With his umbrella he one day
Went walking, feeling bright and gay.

Too soon his troubles were begun,
So very hot did shine the sun,
So his uncovered curly head
He shaded with umbrella red.

Then up came Jack, toys in his hand,
To watch the Moor stride on the sand.
Tom brought a hoop, and Will at last
With his new flag came running fast.

They screamed and laughed—yes, all the three,
When that poor nigger they did see;
Because as black as soot was he.



Just then passed by—whom do you think?—
All laden with a pot of ink,
None other than good Santa Claus;
He saw how bad their purpose was.

He called out in an angry tone:
"Boys, leave the blackamoor alone.
For if he tries with all his might
He cannot change from black to white."

But those three boys were not polite,
They laughed and mocked with all their might;
And sneered more even than before
About that little blackamoor.

Then Santa Claus did interfere,
He was so cross! You see it here.
He seized them; little did he care
Whether by arms, or legs, or hair.

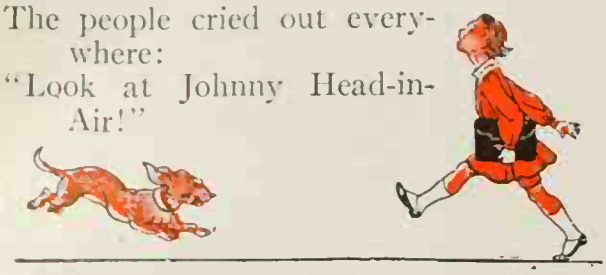
Right into the ink-pot he put Will,
Bad Jack, and Tom; they kept not still.
When Santa held them very tight,
They kicked and yelled with all their might.

The good saint dipped them in a wink
Right in that bottle of black ink.
And here the boys—their hearts are sore—
Are blacker than the blackamoor.

The nigger boy in front you see
Followed by the unlucky three.
If they had kept their sneering back,
They never would have been turned black.

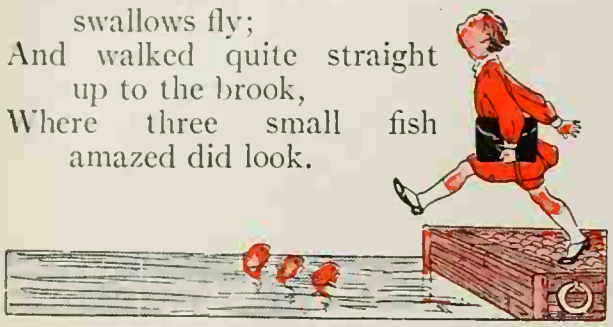
JOHNNY HEAD-IN-AIR

AS he trudged along to school,
It was always Johnny's rule
To be looking at the sky
And the clouds that floated by.
The people cried out everywhere:
"Look at Johnny Head-in-Air!"



Whene'er a dog came running by,
Still Johnny watched the birds on high.
No one cried: "Now mind your nose,
A little dog's beneath your toes!"
Alack! Alack! there came a jog,
And down fell Johnny and the dog.

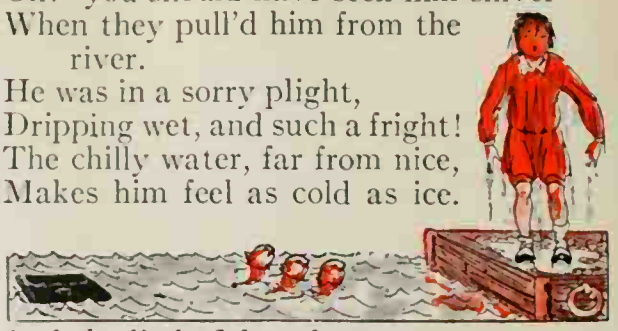
One day he wandered near a brook,
Holding in one hand a book;
He stared, and stared up to the sky,
To see the clouds and swallows fly;
And walked quite straight up to the brook,
Where three small fish amazed did look.



Just one more step, then in a flash
In he tumbled with a splash!
Three small fishes, all afraid,
For their hiding-places made.

Two strong men, each with a hook,
Were standing near that little brook;
They fished him out, all wet, alas!
And laid him on the cool, green grass.

Oh! you should have seen him shiver
When they pull'd him from the river.
He was in a sorry plight,
Dripping wet, and such a fright!
The chilly water, far from nice,
Makes him feel as cold as ice.



And the little fishes three,
Swim about all full of glee;
They laugh and jeer with all their might
To see poor Johnny's sorry plight.
They laugh, and laugh the livelong day
While Johnny's book floats far away.

THE STORY OF FLYING ROBERT

WHEN 'tis pouring hard with rain,
When the storm howls o'er the plain,
Boys and girls are very wise
If they wait for fairer skies.

"I won't wait," daft Robert cried,
"Great must be the fun outside."
With his sunshade he went out,
O'er the fields to roam about.

Now the wind swift onward goes—
Notice how the trees it blows—
Robert's sunshade, flaunting there,
Up is whisked into the air.

Robert, too, goes up withal
Where no ear can catch his call.
Upwards, onwards, he must rush,
Off his hat goes with a gush.

Robert and umbrella fly
Through the clouds up to the sky,
No man in the world can tell
When they stopped or when they fell;
Only this one thing is plain,
Rob was never seen again.

RIP VAN WINKLE

HIS STRANGE ADVENTURE IN THE MOUNTAINS

CONTINUED FROM 4688

WHOEVER makes a voyage up the Hudson River will see the famous Catskill Mountains, that are a branch of a still greater range stretching away to the west of the river, swelling up to a noble height, and lording it over the surrounding country. Every change of season, every change of weather, indeed, every hour of the day, produces some change in the magical hues and shapes of these mountains, and they are regarded by all the good wives, far and near, as perfect barometers.

When the weather is quite fair and settled, they are clothed in blue and purple, and print their bold outlines on the clear evening sky; but sometimes, when the rest of the landscape is cloudless, they gather a hood of grey vapors about their summits, which, in the last rays of the setting sun, glow and light up like a crown of glory.

In a tiny village at the foot of these fairy mountains there lived many years ago a simple, good-natured fellow of the name of Rip Van Winkle. He was a kind neighbor and an obedient husband, and was a general favorite. The children would shout with joy whenever he approached. He assisted at their sports, made their little playthings, taught them to fly kites and to shoot marbles, and told them long stories of ghosts, witches, and Indians. Whenever he went roaming about the village he was surrounded by a troop of boys and girls hanging on his skirts, clambering on his back, and playing a thousand tricks on him with impunity, and not a dog would bark at him throughout the neighborhood.

The great failure in Rip's character was a very great dislike to all kinds of profitable labor. It could not have been from the want of application or perseverance, for he would sit on a wet rock, with a rod as long and heavy as a Tartar's lance, and fish all day without a murmur, even though he should not be encouraged by a single nibble. He would carry a gun on his shoulder for hours together, trudging through woods and swamps, and up hill and down dale, to shoot a few squirrels or wild pigeons.

He would never refuse to assist a neighbor even in the roughest toil, and was a foremost man at all country frolics for husking Indian corn or building stone fences; the women of the village, too, used to employ him to run their errands, and to do such little odd jobs as their less

obliging husbands would not do for them. In a word, Rip was ready to attend to anybody's business but his own; but as to doing family duty, and keeping his farm in order, he found it impossible.

In fact, he declared it was of no use to work on his farm; it was the most unprofitable little piece of ground in the whole country; everything about it went wrong, and would go wrong, in spite of him. His fences were continually falling to pieces; his cow would either go astray or get among the cabbages; weeds were sure to grow quicker in his fields than anywhere else; the rain always made a point of setting in just as he had some outdoor work to do; so that though his estate had dwindled away, acre by acre, under his management, until there was little more left than a mere patch of Indian corn and potatoes, yet it was the worst-conditioned farm in the neighborhood.

His children, too, were as ragged and wild as if they belonged to nobody. His son Rip promised to inherit the habits with the old clothes of his father. He was generally seen trooping like a colt at his mother's heels, equipped in a pair of his father's cast-off breeches, which he had much difficulty in holding up with one hand, as a fine lady does her train in bad weather.

Rip Van Winkle, however, was one of those happy mortals who take the world easily, eat white bread or brown, whichever can be got with least thought or trouble, and would rather starve on a penny than work for a dollar. If left to himself, he would have whistled life away in perfect contentment; but his wife kept continually shouting in his ears about his idleness, his carelessness, and the ruin he was bringing on his family.

Rip's sole domestic friend was his dog Wolf, who was as much henpecked as his master; for Dame Van Winkle regarded them as companions in idleness, and even looked upon Wolf with an evil eye as the cause of his master going so often astray.

Times grew worse and worse with Rip Van Winkle as the years rolled on. A tart temper never mellows with age, and a sharp tongue is the only edged tool that grows keener with constant use. For a long while he used to console himself, when driven from home, by frequenting a kind of club of the sages, philosophers, and other idle people of the village, which held its sessions on a bench before a small inn, that had for its sign a ruddy portrait of his Majesty King George the Third.

The opinions of this little band were completely controlled by Nicholas Vedder, a patriarch of the village, and landlord of the inn, at the door of which he took his seat from morning till night, just moving sufficiently to avoid the sun and keep in the shade of a large tree, so that the neighbors could tell the hour by his movements as accurately as by a sun-dial. It is true he was rarely heard to speak, but smoked his pipe incessantly. His friends, however, perfectly understood him, and knew how to gather his opinions.

When anything that was read or related displeased him, he was observed to smoke vehemently, and to send forth short, frequent, and angry puffs; but when pleased he would inhale the smoke slowly and tranquilly, and emit it in light and placid clouds; and sometimes, taking the pipe from his mouth and letting the fragrant vapor curl about his nose, would gravely nod his head in token of perfect approbation.

From even this stronghold the unlucky Rip was at length routed by his nagging wife, who would suddenly break in upon the tranquillity of the assemblage and abuse the members for their laziness. Nor was that august personage, Nicholas Vedder himself, sacred from the daring tongue of this terrible woman, who charged him outright with encouraging her husband in his habits of idleness.

Poor Rip was at last reduced almost to despair, and his only alternative to escape from the labor of the farm and clamor of his wife was to take gun in hand and stroll away into the woods. Here he would sometimes seat himself at the foot of a tree and share the contents of his wallet with Wolf, with whom he sympathized as a fellow-sufferer in persecution.

In a long ramble of the kind, on a fine autumnal day, Rip had unconsciously scrambled to one of the highest parts of the Catskill Mountains. He was after his favorite sport of squirrel-shooting, and the still solitudes had echoed and re-echoed with the reports of his gun. Panting and fatigued, he threw himself,

Rip Van Winkle saw a strange figure slowly toiling up the rocks, and bending under the weight of something he carried on his back. He was surprised to see any human being in this lonely and unfrequented place.

late in the afternoon, on a green knoll covered with mountain herbage that crowned the brow of a precipice. From an opening between the trees he could overlook all the lower country for many a mile of rich woodland. He saw at a distance the lordly Hudson far, far below him, moving on its silent, majestic course, with the reflection of a purple cloud, or the sail of a lagging bark, here and there sleeping on its glassy bosom, and at last losing itself in the blue highlands.

For some time Rip lay musing on this scene; evening was gradually advancing; the mountains began to throw their long, blue shadows over the valleys; he saw that it would be dark long before he could reach the village, and he heaved a heavy sigh when he thought of encountering the terrors of Dame Van Winkle.

As he was about to descend, he heard a voice from a distance hallooing: "Rip Van Winkle! Rip Van Winkle!" He looked round, but could see nothing but a crow winging its solitary flight across the mountain. He thought his fancy must have deceived him, and turned again to descend, when he heard the same cry ring through the still evening air: "Rip Van Winkle! Rip Van Winkle!" At the same time Wolf bristled up his back, and, giving a loud growl, skulked to his master's side, looking fearfully down into the glen.

Rip now felt a vague dread stealing over him; he looked anxiously in the same direction, and perceived a strange figure slowly toiling up the rocks, and bending under the weight of something he carried on his back. He was surprised to see any human being in this lonely and unfrequented place; but supposing it to be someone of the neighborhood in need of his assistance, he hastened down to help.

On nearer approach, he was still more surprised at the singularity of the stranger's appearance. He was a short, squarely-built old fellow, with thick, bushy hair and a grizzled beard. His dress was of the antique Dutch fashion —a cloth jerkin strapped round the waist; several pairs of breeches, the outer one of ample volume, decorated with rows of buttons down the sides, and bunches of ribbon at the knees. He bore on his shoulder a stout keg that seemed full of liquor, and made

signs for Rip to approach and assist him with the load. Though rather shy and distrustful of this new acquaintance, Rip complied with his usual alacrity, and, mutually assisting each other, they clambered up a narrow gully, apparently the dry bed of a mountain torrent.

As they ascended, Rip every now and then heard long, rolling peals, like distant thunder, that seemed to issue out of a deep ravine, or cleft, between lofty rocks, toward which their rugged path conducted. He paused for an instant, but, supposing it to be the muttering of one of those fitful thunder-showers which often take place in mountain heights, he proceeded.

Passing through the ravine, they came to a hollow, like a small amphitheatre, surrounded by perpendicular precipices, over the brinks of which tall trees shot their branches, so that they only caught glimpses of the azure sky and the bright evening cloud. During the whole time Rip and his companion had labored on in silence, for though the former marveled greatly what could be the object of carrying a keg of liquor up this wild mountain, yet there was something strange about the unknown that inspired awe and checked familiarity. On entering the amphitheatre, new objects of wonder presented themselves. On a level spot in the centre was a company of odd-looking old men playing at ninepins. They were dressed in a quaint, outlandish fashion—some wore short doublets, others jerkins, with long knives in their belts, and most of them had enormous breeches, of similar style to that of the guide's.

Their visages, too, were peculiar—one had a large head, broad face, and small, piggish eyes; the face of another seemed to consist entirely of nose, and was surmounted by a black sugar-loaf hat, set off with a little red cock's tail. They all had beards of various shapes and colors.

There was one who seemed to be the commander. He was a stout old gentleman, with a weather-beaten countenance; he wore a lace doublet, broad belt and hanger, high-crowned hat and feather, red stockings, and high-heeled shoes, with roses in them.

The whole group reminded Rip very much of the figures in an old Flemish painting that he had seen in the parlor of Dominie Van Shaick, the village parson,

On entering the amphitheatre, new objects of wonder presented themselves to Rip Van Winkle. On a level spot in the centre was a company of odd-looking men, dressed in an old fashioned manner playing ninepins.

and which had been brought over from Holland at the time of the settlement.

What seemed particularly odd to Rip was, that though these folks were evidently amusing themselves, yet they maintained the gravest faces, the most mysterious silence, and were, withal, the most melancholy party of pleasure he had ever witnessed. Nothing interrupted the stillness of the scene but the noise of the balls, which, whenever they were rolled, echoed along the mountains like rumbling thunder.

As Rip and his companion approached them, they suddenly stopped their play, and stared at him with such fixed, statue-like gaze, and such strange, uncouth countenances, that his heart turned within him and his knees smote together. His companion now emptied the contents of the keg into large flagons, and made signs to him to wait upon the company. He obeyed with fear and trembling; they drank the liquor in profound silence, and then they returned to their game.

By degrees Rip's awe and fear subsided. He even ventured, when no eye was fixed upon him, to taste the beverage, which he found very good. He was naturally a thirsty soul, and was soon tempted to repeat the draught. One taste provoked another, and he repeated his visits to the flagon so often that at length his senses were overpowered, his eyes swam in his head, his head gradually declined, and he fell into a deep sleep.

On waking, he found himself on the green knoll whence he had first seen the old man of the glen. He rubbed his eyes—it was a bright, sunny morning. The birds were hopping and twittering among the bushes, and the eagle was wheeling aloft and breasting the pure mountain breeze. "Surely," thought Rip, "I have not slept here all night." He recalled the occurrences before he fell asleep—the strange man with a keg of liquor; the mountain ravine; the wild retreat among the rocks; the woe-begone party at ninepins; the flagon.

"Oh, that wicked flagon!" thought Rip. "What excuse shall I make to Dame Van Winkle?"

He looked round for his gun, but in place of the clean, well-oiled weapon he found an old firelock lying by him, the barrel encrusted with rust, the lock falling off, and the stock worm-eaten. He now suspected that the grave men of the mountain had played a trick upon him, and, having dosed him with liquor, had robbed him of his gun. Wolf, too, had disappeared, but he might have strayed away after a squirrel or partridge. He whistled after him and shouted his name, but all in vain.

He determined to revisit the scene of the last evening's gambol, and if he met with any of the party, to demand his dog and gun. As he rose to walk, he found himself stiff in the joints and wanting in his usual activity. "These mountain beds do not agree with me." thought Rip, "and if this frolic should lay me up with a touch of rheumatism, I shall have a bad time with Dame Van Winkle." With some difficulty he got down into the glen: he found the gully up which he and his companion had ascended the preceding evening; but, to his astonishment a mountain stream was now foaming down it, leaping from rock to rock and filling the glen with babbling murmurs. He, however, tried to scramble up its sides, working his toilsome way through thickets of birch and witch-hazel, and sometimes tripped over the wild grape-vines that twisted their tendrils from tree to tree, and spread a kind of network in his path.

At length he reached the place where the ravine had opened through the cliffs to the amphitheatre; but no traces of such opening remained. The rocks presented a high, impenetrable wall, over which the torrent came tumbling in a sheet of feathery foam, and fell into a broad, deep basin, black from the shadows of the surrounding forest. Here, then, poor Rip was brought to a stand. He again called and whistled after his dog; he was only answered by the cawing of a flock of idle crows above him. What was to be done? The morning was passing away, and Rip felt famished for want of his breakfast. He grieved to give up his dog and his gun; he dreaded to meet his wife, but it would not do to starve among the mountains. He shook his head, shouldered his rusty firelock, and turned his steps towards his distant home. What happened to him afterwards is told in the continuation of this story on page 4861.

THE TALE OF BOB SINGLETON

TOLD AGAIN FROM THE FAMOUS BOOK BY THE AUTHOR OF ROBINSON CRUSOE

"WHY do you always come to stay at this little village of Islington after each of your voyages, Captain Singleton?" said the innkeeper's pretty daughter, Mary. "You have no friends here, that I can see. For those gipsies and beggar women that you are always talking to are not your friends, surely?"

"No, they are not my friends, Mary," said the captain—a fine, tall man, with bronzed face and blue eyes. "They're my enemies, in a way of speaking. Get me another mug of cider, lass, and I will tell you the story of my life, if you care to hear it.

Mary was very eager to hear it. For about fifteen years the captain had always come to the inn at Islington after a voyage, and nobody could make out how it was that the place attracted the lonely, thoughtful sailor. Mary, a sweet and simple girl of eighteen, brought in the cider, and sat down on a chair beside the captain, who lighted his pipe and puffed it thoughtfully, and then began his tale:

"Bob Singleton is not my real name. I cannot tell you, Mary, what my real name is, and I do not know where I was born. But I think it must have been 1680 when I came into the world. That would make me now forty years of age."

"Oh, you don't look as old as that!" said Mary.

"There's nothing like seafaring," said Singleton, "to keep a man young-looking and healthy. But to go on with my yarn. My parents must have been rich, whoever they were; for when I was a little boy about two years old I had a nurse-maid to look after me. One summer evening she brought me to these fields of Islington for a walk, and met a young man, who was her sweetheart. They went into an inn—no doubt this very place—and sat down to supper, leaving me playing outside the door.

"As I was running gaily about the fields, tumbling in the grass and plucking flowers, a gipsy woman came by, and, snatching me up in her arms, she ran away with me to London. There I was sold for twelve shillings to a beggar woman, who wanted a pretty child to take about with her to excite the pity of the people she begged from."

"That is why you are always going among the gipsies," said Mary. "You want to find the woman who stole you, and see if she can tell you anything of your parents?"

Captain Singleton nodded.

"She was a good creature in her way, that beggar woman," he continued. "She treated me very kindly, and never let me want for anything, and I must have wandered all over England with her.

"I used to think she was my real mother. It was not until she fell ill that she told me how I had been stolen by a gipsy, and sold for twelve shillings. Unhappily, she did not know anything about my true parents, and when she died, at Bussleton, a place near Southampton, I was left alone in the world without shelter, food, or friend.

"At this time I was a lad of about twelve years old, dressed in miserable rags, and I dare say very lean and hungry-looking. There are good people in this world, Mary, as well as bad. A master of a ship happened to see me begging in the street, and, taking pity on me, he carried me to sea with him to Newfoundland.

"You may be sure that I worked my hardest to please my kind master. I went on four voyages with him, and, what with good treatment and good exercise, I was at the age of fifteen as strong and as sturdy a lad of my years as you could wish to see. But as we were coming home from the banks of Newfoundland our vessel was captured by a Moorish pirate ship."

"Was there a fight?" said Mary.

"Yes," replied the captain, "and my poor master was badly wounded; but the Moors took care of me, though I could not guess why at the time. I can now see that, as I was then a fine, strapping lad, I should have fetched a high price as a slave. By good luck, however, I did not reach the slave market. The Moors took our ship in tow, and sailed

away with it to Algiers. But in the Bay of Cadiz the pirate ship was attacked by two great Portuguese men-of-war, and taken and carried into Lisbon."

"You were fortunate to be rescued from the wicked Moorish pirates," said Mary.

"It was not much of a rescue for me," said Captain Singleton sadly. "My master died of his wounds at Lisbon, and I then found myself there in a worse position than I had been in at Bussleton. Not only was I houseless and starving, but I was in a foreign country, and could not speak a word of their language.

"I had one good friend, however, and that was my old master's ship dog. It used to steal meat and bring it to me, and with this food I managed for some time to keep body and soul together. At last, having acquired a smattering of the Portuguese tongue, I shipped as a sailorman on a great galleon bound for the East Indies."

"But why didn't you try to return to England?" exclaimed Mary.

"I wanted to see the world," said Captain Singleton. "Besides, I had no friends to go to in England, or anywhere else. But I saw more of the world when I left Lisbon than I bargained for. I never got to the East Indies, for the Portuguese crew mutinied and obtained command of the ship, and wrecked it in trying to enter a bay on the coast of Mozambique, where they meant to set up as pirates.

"Mozambique is on the east coast of Africa, opposite Madagascar," continued Captain Singleton, "and it is peopled by savage negroes. Running into the bay was a river about as broad as the Thames at Gravesend. We filled our small boats with plenty of provisions and fire-arms, and sailed and rowed up this river nearly two hundred miles till we came to a great waterfall. Then we landed and divided our powder and shot, which were our means of getting food, and set out on a march of two thousand miles, right across the unknown continent."

"How terrible that must have been!" cried Mary.

"It was very terrible," replied Captain Singleton. "Sometimes the natives gathered in great numbers to oppose us, and it was only because they had never heard a gun go off, and were frightened by the noise, that they let us pass. We nearly perished from thirst in a great desert, and we had to waste a great deal of our precious gunpowder in defending ourselves against savage beasts.

"All our troubles and discomforts, however, were forgotten when we came to a great river which, as we afterwards found, ran to a Dutch settlement on the Gold Coast. For the sand on the shore of the river was full of gold. We stayed there three months washing the gold out of the gravel, and when we had each gathered about five hundred pounds' worth of this precious metal, we made a raft and floated in eleven days down to the Dutch settlement, and there I and the Portuguese parted. I went away to Cape Coast Castle, where I got a passage for England, and with my gold, Mary, I bought a fine ship of my own, which I still have."

"You have had an extremely adventurous life," said Mary, with a sweet smile, "and you have, no doubt, made a great deal of money. But why do you always seem so unhappy, Captain Singleton?"

"That is because I am very lonely," said the captain, taking her hand. "Mary, dear, I have given up looking for parents, for I know now that I have found all that I want to make me happy."

"What is that?" said Mary.

Everybody in Islington saw what it was three weeks later, when Captain Singleton and Mary were married in the fine old village church.

THE MILK THAT SPRANG INTO LIFE

WHEN Hercules was a baby, the chief of the gods, Jupiter, wished to make him immortal, and therefore placed him where he could obtain the divine milk that should make him live for ever.

The little Hercules was over-anxious to get this wonderful food, and in his eagerness spilt some of it upon the earth, where the drops at once sprang up into life as the beautiful lily, the symbol of all that is pure and true and good in life. When Hercules grew up he performed the twelve great labors about which we read elsewhere in this book.

ANDROCLES AND THE LION

ANDROCLES was a poor Roman slave who was carried away to Northern Africa many hundreds of years ago. His life was very hard and painful, and his master was a very cruel man. At last he resolved that he would try to escape to the sea-coast, and get back to Rome.

He knew that if he were caught he would be put to death; so he waited till the nights were dark and moonless, and then he crept out of his master's house and stole through the town, and got into the open country.

On and on he hastened through the darkness as fast as his legs would carry him. But when the day broke he found that, instead of making towards the sea-coast, he had struck into the great lonely desert. He was tired out, hungry, and thirsty, and seeing a cave in the side of some cliffs, he crept into it, lay down, and very soon fell into a gentle sleep. Suddenly he was awakened by a terrible roaring, and, starting to his feet, he beheld a huge tawny lion standing at the entrance to the cave. Androcles had been sleeping in its den. He could not escape; the great lion barred the way. Utterly terror-stricken, he waited for the great beast to spring upon him and kill him.

But the lion did not move. It moaned and licked one of its paws, from which blood was flowing. Seeing that the animal was in great pain, Androcles forgot his terror, and came forward, and the lion held up its paw, as if it were asking Androcles for help.

ANDROCLES DREW THE GREAT THORN OUT OF THE LION'S PAW WITH A QUICK MOVEMENT

Androcles then perceived that a great thorn had got into the paw, and cut it, and made it swell. He drew the thorn out with a quick movement, and then pressed the swelling and stopped the flow of blood.

Relieved of the pain, the grateful lion limped out of the cave, and in a few minutes it returned with a dead rabbit,

which it laid beside Androcles. When the poor slave had cooked and eaten the rabbit, the lion led him to a place in the cliffs where there was a spring of fresh water gushing from the earth.

For three years the man and the lion lived in the cave. They hunted together and slept together, and the great, shaggy, affectionate creature used to lie down at night at Androcles' feet, and slowly wag his huge bushy tail from side to side, as a cat does when it lies before the fire and feels happy and comfortable.

But at last Androcles began to weary for the society of his fellow-men. So he left the lion's cave, but he was soon caught by some soldiers and sent as a fugitive slave to Rome. The ancient Romans were very cruel to runaway slaves, and they sentenced Androcles to be killed by wild beasts in the arena on the first public holiday.

A vast multitude of spectators came to see the pitiful sight, and among them was the Emperor of Rome, who sat on a high seat above the arena, surrounded by his senators. Androcles was pushed into the great open space, and a lance was thrust into his hand. With this, he was told, he would have to defend himself against a powerful lion which had been kept for days without food to make it savage and fierce. The poor man was given a chance of surviving; but, as he knew, it was a very, very poor chance.

He trembled when the hungry lion sprang out of its cage with a terrible roar, and the lance shook in his feeble grasp as the huge beast came bounding up to him. But instead of rushing fiercely at him, and bearing him down, it wagged its tail and began to lick his hands. Then Androcles saw that it was his own lion with whom he had lived in the cave, and he patted it and leaned on its head and cried.

All the spectators marveled at the strange scene, and the emperor sent for Androcles and asked him for an explanation of it. And he was so delighted with the wonderful story that he made Androcles a free man, and gave him a large sum of money. Thereafter, Androcles used to walk about the streets of Rome, and the faithful lion followed him like a dog wherever he went.

COMMENT GOTHAM ACQUIT UNE MAUVAISE RÉPUTATION

THE ENGLISH VERSION OF THIS STORY IS GIVEN ON PAGE 4126.

TOUT le monde a entendu parler des sages Fous de Gotham. Mais peut-être ne savons-nous pas qui ils étaient, ni où Gotham se trouve, ni ce que signifie exactement "Les sages Fous."

Voici l'histoire: Gotham est un village du Comté de Nottingham, et un jour, Sa Majesté le Roi Jean d'Angleterre, allant vers la ville de Nottingham, ordonna que sa suite passât à travers la prairie de Gotham, où on croyait alors que tout terrain par où passait le Roi devenait désormais route publique. Les gens de Gotham, qui tenaient à leur prairie, s'arrangèrent pour empêcher le Roi Jean d'y passer. Le Roi, rendu furieux par leurs façons, envoya ses officiers pour faire une enquête dans le village.

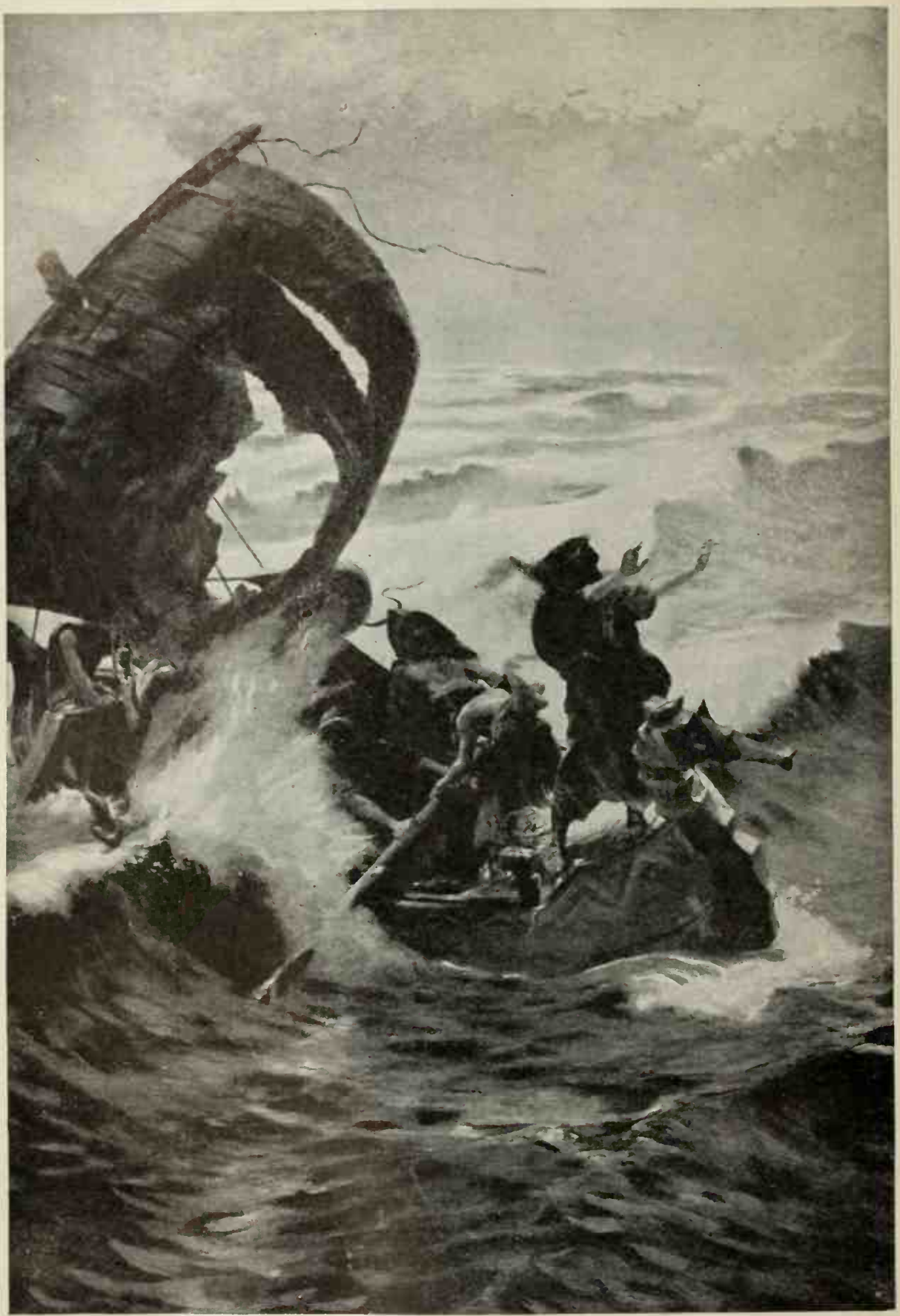
Quand les officiers arrivèrent, ils trouvèrent quelques-uns des habitants qui criaient et faisaient du bruit au bord d'un étang. Ils tenaient une anguille au bout d'une ficelle et essayaient, disaient-ils, *de la noyer dans l'étang!* Ils en virent d'autres qui faisaient rouler des fromages le long au bas de la route —leur donnant de l'élan et les laissant ensuite voyager tout seuls. Ils disaient qu'ils envoyaient leurs fromages au marché de Nottingham. D'autres hissaient en toute hâte, sur une colline, des camions et des charettes. Ils allaient, disaient-ils, mettre un bois à l'ombre des rayons brûlants du soleil. D'autres enfin construisaient une carrière autour d'un buisson où s'était installé un coucou, afin de l'empêcher de s'envoler.

Les officiers partirent à moitié amusés et à moitié dégoûtés, et annoncèrent que Gotham était un village de fous qui ne méritait pas l'attention du Roi.

Mais d'autres personnes, qui en savaient plus long sur cette histoire, dirent qu'il y avait des fous très sages à Gotham, et ainsi, la phrase en vint à signifier de la folie simulée dans un but raisonnable. En fait, c'était un compliment et non une critique à l'égard de Gotham. Un vieil auteur anglais, Thomas Fuller, dit: "Gotham a des gens aussi *sages* que ceux qui se rient, sans cause, de leur simplicité."

THE NEXT STORIES ARE ON PAGE 4859.

COLUMBA'S FIRST SIGHT OF SCOTLAND



This beautiful picture shows Columba sighting the shores of Scotland at the end of his voyage across the stormy seas which rage to the north of Ireland, where Columba lived. He went over to Great Britain with the Gospel more than thirty years before St. Augustine landed in Kent. This time Christianity, which had almost died out after being introduced by the Romans, came to stay and to revolutionize the lives of both the people and their rulers. Columba founded a monastery on the island of Iona, and from that place he sent out his followers to preach the Gospel to the dwellers in the northern half of Great Britain. We can still see the ruins of his monastery, where he lies buried. This picture was painted by Georges Girardot.

The newly-crowned king, Edgar the Peaceable, bids his eight vassal kings cease rowing, that he may hear the chanting of the monks, across the still waters of the Dee, from the minster of St. John.

EARLY LEADERS OF THE CHURCH

CONTINUED FROM 4734

IN the early days of Christianity, the Christians were persecuted by the rulers of the great Roman Empire, who imagined that the new teaching would persuade people that they might destroy the laws. But after a time all that was changed; Christianity became the most favored religion in the empire.

That meant that the clergy, who were the people who gave themselves up to the service of the Church, to praying, and preaching, and teaching—people who were appointed to this particular kind of work, in the particular way ordered by the rules which the Christians had made for themselves in early times—soon came to have a great deal of influence. Pious people gave them money and lands, so that they might build noble churches and cathedrals, and might use their wealth both in helping the poor and oppressed and in spreading Christianity among the heathen.

The clergy were a separate folk from the rest, who were called the "laity," receiving honor and reverence because of their high calling.

Then came the long centuries when new barbarian peoples were moving over the face of Europe, conquering and being conquered, and learning to forsake their old gods and to believe in "the Faith of Christ." In those days war and bloodshed were very common. But although the clergy were not at all secure from violence, yet they were protected much more than other people, and were allowed to give protection to other people who took refuge under their care. Those who fled for refuge to a church or convent were said to have taken sanctuary.

Moreover, in those days all the people in the western half of Europe belonged just to one Church. All the clergy were ruled over by bishops, which means overseers of great districts, which we call *Sees*, except that those who lived together in monasteries were not always subject to the bishops; and the Pope, the Bishop of Rome, was acknowledged as the head of them all, and was called the "Vicar of Christ," meaning the Viceroy of the Kingdom of God on earth.

Now, some of the clergy became missionaries who traveled among the heathen nations and taught them to become Christians, though most of them prayed and preached and taught among their own people. And, seeing that the lay-folk or laity had to spend so much of their time in fighting, it was only the clergy who were left in peace to think about learning and writing books. And because they were the only people who had much of the knowledge that could be gathered from books, kings often chose from among the clergy the counsellors they most trusted to make laws and explain them.

How preachers rebuked kings and became rulers of nations

Sometimes wise and brave men among them would boldly tell the kings and the nobles that they were playing the part of tyrants, and therein disobeying the laws of God, as the prophets of whom we read in the Old Testament used to reprove the kings of Israel and Judah. Some of them held that, although the Pope was not a king, he was greater than all kings, who were bound to obey him, and that the clergy should obey the Pope rather than the king in whose dominions they lived; so that many times there were quarrels between the kings on one side, and the Pope and the clergy on the other, which are often described as quarrels between the State and the Church. And thus it happened that some of them had to become statesmen—that is to say, they had to take part in the governing of nations, even though they would have very much preferred to have nothing to do with such troublesome matters.

We shall not talk now about the early Fathers of the Church, which is the name given to the men who built up the great Christian society in the first centuries, nor about the martyrs who died because they would not sacrifice to false gods. But we may begin our list with the man who spread the faith in the northern part of Great Britain before Augustine landed in Kent and began to convert the Saxons in the south.

How Columba and his followers brought Christianity to Scotland

This was the missionary who is called St. Columba. He was born in Ireland in A.D. 521 and lived there for a long time, and founded several monasteries. For the Irish were Christians while the great majority of the people in England and Scotland were pagans, though it is true that many of the Britons had remained Christians after the Angles and Saxons conquered so much of the country.

One of the men who had carried Christianity to Ireland, nearly a hundred years before Columba was born, was the interesting figure known to us as St. Patrick. He was probably born in Scotland, of a noble family, in 396, and was captured and taken to Ireland as a slave in 411. Escaping, he became a priest, and returned to work in Ireland. He died about 469.

When Columba was forty years old he resolved that he would go to the people of Scotland, who were related to the Irish, and preach the Gospel among them. So he went with twelve of his followers, and built a monastery on the Island of Iona, of which we can see remains to this day. From that little island, he and his followers went out and preached the Gospel among the rude heathen tribes, and converted many.

Next we come to Pope Gregory I., who is rightly called the Great. He was a Roman noble, and might easily have become one of the greatest officers of the Roman Empire; but he chose rather the life of prayer and of service to God, having no thought of his own honor; and yet out of his self-denial the highest honor came to him unsought.

The Pope Gregory who sent Augustine to England

Gregory's wisdom and his goodness won him such love in Rome that, when the Pope Pelagius died, all men said that no other man should be pope but Gregory; and, though he strove hard to be excused, no other man would they have. But, being made pope, he wrought nobly for the Church, and won barbarous peoples over to the true faith.

Moreover, it was this Gregory who sent Augustine to England on a mission to convert the Saxons, as we may read in Church Annals. He was fain to undertake this mission himself before ever he became pope, but even then the rulers of the Church could not suffer him to depart into a far country, having need of him at Rome. And besides all that he did to spread the faith of Christ, he did much to maintain discipline and agreement among the clergy. And men say he gave the Church those chants which are called Gregorian after him.

Now we come to the first Englishman on our list, the Northumbrian Baeda, who is commonly called the Venerable Bede. All England had already become Christian some years before he was born. In his time the kingdom of Northumbria was the most peaceful part of the land, and its kings cared much both for religion and for learning. Bede is famous not as a missionary, or as a statesman, but because, living quietly all his life in the monastery of Jarrow, he was known as a very learned man of his time, so that there was hardly anything which he could not teach better than any other man living in England. But of the books which he wrote, two are most famous. One is his history of England, which tells us nearly all that we know of the early Saxon times, and the other is his translation, in the year A. D. 735, of St. John's Gospel into the Anglo-Saxon tongue, which is famous because of the story which is told on page 4452.

DUNSTAN, THE BISHOP WHO RULED ENGLAND AND PROTECTED THE SLAVES

A very different man comes next—Dunstan, another Englishman, who was born in 925. He was a very clever man, learned and skilled in all manner of arts and sciences, so that at one time men declared he must be a sorcerer. But what was more important was that he was a great statesman who was the real ruler of England for a great many years; and in those years, being Archbishop of Canterbury, he also made many changes in the government of the Church, and made the power of the clergy greater than before.

It was through the wisdom and the counsel of Dunstan that England prospered so greatly in the time of King Edgar, of whom it was said that eight vassal kings were the oarsmen who rowed his barge on the River Dee. For Dunstan said that the people who lived in that part of the land which was called the Danelaw, being for the most part not Saxons, but Danes, should be suffered to keep their own customs. His counsel was followed and they ceased striving to set at defiance the overlordship of the Saxon kings of the house of Alfred. Also he set himself to keep the clergy a folk apart from the laity by making them keep stricter rules, and forbidding them to marry.

One very good thing he did was to give protection to slaves and to teach their owners that it was a good thing to set them free. For in those days there were many slaves in England, and the law suffered their masters to kill them, and laid but light penalties on anyone who slew a slave. But Dunstan taught men that slaves are quite as good as other men in God's sight, and that the priests should not pronounce the words of pardon for wrong done to a slave unless the wrong-doer repented of his sin and did penance for it as much as if he had wronged a free man.

HOW THE CONQUEROR SET LANFRANC OVER THE CHURCH IN ENGLAND

When William the Conqueror made himself King of England, nearly a hundred years later, he was ill-pleased with the state of the Church in England, where the clergy had gone back from the strict ruling of Dunstan, and he brought over, to be Archbishop of Canterbury, an Italian whose name was Lanfranc, who had been the head of the Abbey of Bec, in Normandy. For William wished to have the help of the Church in keeping the Norman barons from becoming too powerful and troublesome, and he knew that Lanfranc would aid him therein.

To this end Lanfranc persuaded William to increase the power and wealth of the Church, and also to separate the clergy from the laity even more than Dunstan had tried to do. Therefore, in the bishoprics and at the head of the great monasteries, called abbeys or priories, he set, whenever it was possible, not Englishmen, but foreigners, who lived by the stricter rule. He put an end altogether to the practice of the clergy marrying and he arranged with the king that from this time the clergy should not be subject to the ordinary laws of the land in their private doings, but only to the law of the Church, and should be judged only by courts made up of clergy; and that, moreover, if there were disputes between clergy and laity, these Church courts should judge.

HOW THE RED KING'S WICKEDNESS WAS STAYED BY THE SCHOLAR ANSELM

Now, after William the Conqueror died, William Rufus, the Red King, came to the throne, and soon after that Lanfranc died also. The Red King would not appoint a new archbishop, but seized for himself the money which the archbishop should have had for

AUGUSTINE PREACHING TO THE EARLY ENGLISH: HIS APPEAL TO KING ETHELBERT & HIS QUEEN

Gregory the Great sent Augustine to preach Christianity to the Saxons, who had ruled in England for a hundred years. He set foot in England at the very spot in Kent where Hengist and Horsa, the pagan Saxons, had landed, and founded a monastery at Canterbury, where he became the first bishop. King Ethelbert was persuaded by his wife, who was a Christian, to permit Augustine and his monks to preach the Gospel, and before long he was able to write to Gregory that over 10,000 people had been converted.

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the use of the Church. Yet, when William fell very sick and thought he was about to die, he feared for his soul because he had robbed the Church, and so he appointed a new archbishop. Yet he fancied he could save his soul if he died, and continue in his evil courses if he lived, if he chose for archbishop someone whom he could frighten into working his own will; and so he appointed a certain very gentle and pious scholar named Anselm, another Italian, who was now Abbot of Bec as Lanfranc had been. Anselm was fain to refuse, but, as he might not, he very soon showed William how ill he had judged him by reason of his gentleness. The gentle Anselm was a very lion for boldness in the cause of justice and righteousness, and would in no wise obey the king's behests when they were evil, as they commonly were; nor would he suffer William to rob the Church or to set up bishops and abbots at his own will who would do his bidding and pay him great sums of money.

The sea-rovers often raided the English coasts and carried off men, women, and children to sell in other lands. Pope Gregory once saw some fair-haired slaves in the market at Rome. "Who are they?" he asked. "Angles," was the reply. "Not Angles, but angels," said Gregory; and it is said to have been then that Gregory resolved that the Gospel should be sent to the far-off home of those fair-haired strangers.

Three hundred years have passed away, and we now witness in this picture a very different scene. Christianity has been working its wonderful way through the length and breadth of the island, and here we see an English bishop setting free the slaves of a master who has become a Christian, and consequently felt it wrong that he should have the power of life and death over a servant.

The strife between them waxed so hot that Anselm had to leave England. When the Red King was dead, and the wise King Henry I. reigned in his stead, Anselm came back to England, and readily made agreement with the king that the bishops and abbots should do the king homage for their lands as the barons did, but should be appointed according to the rules of the Church, and not according

to the will and pleasure of a king whose intent might be evil.

This quarrel between the kings and the archbishop was a part of a great quarrel between Church and State, which had been going on for many years past. For there had been at Rome a certain monk named Hildebrand, who had been the chief advizer of more than one of the popes, and then himself became Pope Gregory VII. Now, Gregory held that it was the will of God to rule the world through two powers—the temporal power, which means the emperors and kings of the different countries, and the spiritual power, which means the Church which was one in all lands, ruled over by the Pope. And of these two powers he accounted the spiritual power the greater; very much as Samuel and Elijah spoke the Word of the Lord to Saul and Ahab. And so it seemed to him that the reign of God upon earth would be made manifest only when emperors and kings humbled themselves before the Pope. And this he believed all the more because he knew that he himself loved righteousness and hated iniquity, whereas the emperors and kings sought their own advantage more than the glory of God. Therefore, Gregory would have the Church set wholly free from the rule of emperors and kings. But these latter were in no wise ready to believe that the bidding of popes and bishops

KING EGFRID OFFERING A BISHOPRIC TO THE MONK WHO HAD BEEN A SHEPHERD BOY

Here we see Egfrid, King of Northumberland, offering the bishopric of Hexham to Cuthbert, who began life as a shepherd, but became a monk at Melrose, and subsequently led the life of a hermit on an islet off Northumberland. It is not known whether he accepted the king's offer. In 685 he became Bishop of Lindisfarne, but resigned soon afterwards to return to his hermitage. He died in 687, and was buried at Lindisfarne, but his body was afterwards removed to Durham Cathedral. This picture was painted by W. Bell Scott.

AN EMPEROR THREE DAYS IN THE SNOW

In the course of a struggle between Pope Gregory VII. and the Emperor Henry IV. of Germany, the Pope declared that the emperor could no longer be a member of the Church, and deposed him from his throne. Henry, unable to bear the results of this disgrace, journeyed over the slippery slopes of Mont Cenis, in the depth of a severe winter, that he might make his peace with the angry Pope. Gregory retired to the castle of Canossa, high up in the Apennines, where he was followed by the emperor. For three days Henry, clad in the thin white robe of a penitent, shivered in the courtyard of Canossa, and the Pope at length forgave him.

was in very truth the sound of the voice of God, and the kings would have all men in their realms obey them, priests as well as laymen. So there was strife between Pope Gregory and the Emperor Henry IV. of Germany.

HOW POPE GREGORY KEPT AN EMPEROR STANDING THREE DAYS IN THE SNOW

Seeing that those who wished ill to the emperor were ready enough to aid Gregory against him, the emperor was forced to humble himself for a time, and to stand in the snow in the garb of a penitent for three days, praying for the Pope's pardon at a place called Canossa, though in after time he defied Gregory again and got the better of him. Yet Gregory had taught so many men to believe that in this quarrel the cause of the Church was the cause of God, that for nearly two hundred years to come it often seemed that the Pope was mightier than emperor or king.

Dunstan was a very clever and pious Englishman. As Archbishop of Canterbury his influence over the kings was so great that he was himself the real ruler of England. He gave protection to the many slaves who were at that time in England, and encouraged their owners to give them their freedom. In this picture we see him reproving King Edwy because he had broken one of the laws of the Church.

So it befell that there was another pope to whom one of the greatest of the German emperors, Frederic Barbarossa, was forced to submit himself for a time; and this was the only Englishman who has ever been pope. His name was Nicholas Breakspear, but when he became pope he was called Adrian IV., just as Hildebrand has been called Gregory VII. But Adrian was not a great enough man to have been mentioned here, except for his having been the only Englishman that ever was pope. He died in the year 1159.

But in Adrian's days there was a famous archbishop who stood up against the King of England, Henry II. For the king saw that much evil came of the rules that had been useful when they were first made by Lanfranc and William, because the Church courts were now used to protect the clergy from being properly punished when they broke the ordinary laws of the kingdom. And he thought that if his friend, Thomas à Becket, were made archbishop, he would help him to make the clergy submit to the law. But when Becket became archbishop, he became the champion of the Church against the king, and would not submit to have any change made, declaring that the clergy must be punished only by the power of the Church and not by the power of the king. The brave Becket was slain in the cathedral at Canterbury, and how the king did penance for that murder, and did not dare any longer to strive against the power of the Church, we read in Church history; also how Adrian IV. bestowed Ireland upon the King of England.

POPE INNOCENT, WHO MADE STEPHEN LANGTON ARCHBISHOP OF CANTERBURY

And now we come to the pope whom some people reckon the greatest of all, for he was not only the most powerful, but also, like Gregory VII., he was one who loved righteousness and hated iniquity. Nevertheless, in after times men have not all agreed that he was right in some of the things which he counted for righteousness or for

iniquity. This was Innocent III., who was the youngest man who was ever made pope. Like Gregory, he believed that the Pope was set over the Church and over all men as a ruler, having all sceptres and thrones subject to him.

So great was Innocent's power that he was able to decide which of two princes who claimed to be emperor should be acknowledged. When the great King of France, Philip Augustus, committed sin, he made him cease from his wrongdoing, and the King of Leon, in Spain, in like manner; and we read in the history of England how he placed that land under an interdict, and would have taken away King John's crown and given it to the King of France, if John had not made submission. Therein Innocent thought he was doing rightly, though in England there were few who were ready to admit that any foreign priest, were he the Pope himself, had power and authority to choose a king for England. Yet the Pope did these things out of the desire that men should live righteously.

Now, there was one thing he did for which British and Americans alike should respect his memory, for the archbishop whom he chose for Canterbury was Stephen Langton; and Archbishop Stephen feared neither Pope Innocent nor King John, but stood up manfully for justice and right, claiming from the king for the Church no more than the Church's due, and yielding to the Pope's bidding no more than was his due. For what he had at heart was the good of the whole people of England. And when Innocent was reconciled to John by the king's submission, Langton was none the readier to suffer John to play the tyrant, but himself played a large part in uniting the barons to demand from the king the great Charter. This he did, though Innocent himself bade him desist. And thereafter, when John was dead, and there were some of the barons who disliked the Charter because it hindered them also from playing the tyrant over their vassals, it was by Langton's influence that the Charter was again confirmed in spite of them. This Charter is the foundation on which our liberty has been built. When Langton himself was dead, there were other bishops ready to follow the great example he had set, yielding to the dictation neither of Pope nor king nor barons, but standing up stoutly against tyranny and oppression. But of these there are two whose names should be remembered — Archbishop Edmund Rich of Canterbury, and Grosseteste, Bishop of Lincoln who was the friend of the great Earl Simon de Montfort.

Other bishops and popes there were in later days who strove hard in order to make the power of the Church greater than the power of the rulers, before the Reformation came; after which event the rulers were never again forced to bow to the will of the Pope, and the heads of the Church were never again the great power in the land that they had been.

Stephen Langton was one of the greatest churchmen who ever had power in England. He feared neither the Pope nor King John. In this picture he is persuading the barons to help him to obtain Magna Carta from King John. This picture and those on pages 4793 and 4796 are published by permission of the Society for Promoting Christian Knowledge.

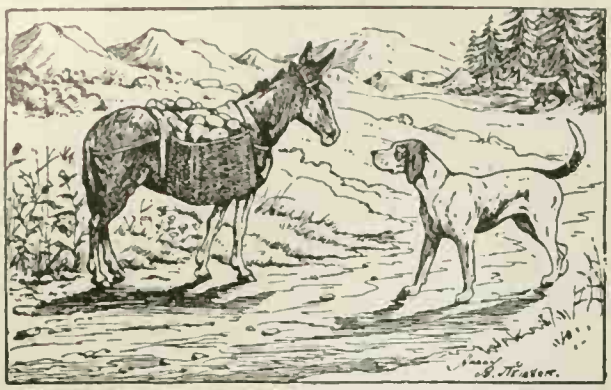
THE NEXT STORIES OF MEN AND WOMEN BEGIN ON PAGE 4941

ÆSOP'S FABLES TOLD IN FRENCH

The following stories, told in French, are from the fables of Æsop the Slave, of which a large number appear in other parts of this book. The stories appear in English in that part of our book beginning on page 2887, so that boys and girls learning French can translate them and compare the translation with the English copy.

LE CHIEN ET L'ÂNE

UN grand chien et un âne chargé de pain faisaient un long voyage ensemble. Tous deux, bientôt, eurent



très faim et l'âne s'arrêta pour manger des chardons au bord du chemin. Ceci augmenta la faim du chien et il demanda un morceau de pain de la charge de l'âne.

Mais l'âne répondit que s'il avait faim, il devait trouver sa nourriture le long du chemin, comme lui-même, car il n'avait pas de pain à donner.

A ce moment, ils virent au loin un loup venir vers eux. L'âne aussitôt se mit à trembler et dit au chien qu'il espérait qu'il l'aiderait et le protégerait si le loup l'attaquait.

"Non," dit le chien. "Ceux qui mangent seuls, doivent lutter seuls."

Et il abandonna son compagnon à la merci du loup.

Si vous voulez des amis, soyez amical.

L'AVOCAT ET LES POIRES

UN avocat fut invité un jour à un banquet de mariage dans une maison assez éloignée de la sienne.

Sur son chemin, il trouva un petit

panier de poires mûres au bord du sentier. Il avait assez faim pour les manger pour son déjeûner, mais il songeait au festin et ne voulût pas gâter son appétit; il donna donc un coup de pied aux poires et les envoya dans le fossé boueux.

Un peu plus loin, il dût traverser une petite rivière; mais elle était tellement grossie par les pluies récentes que la passerelle avait été emportée, et il n'y avait aucun bateau en vue.

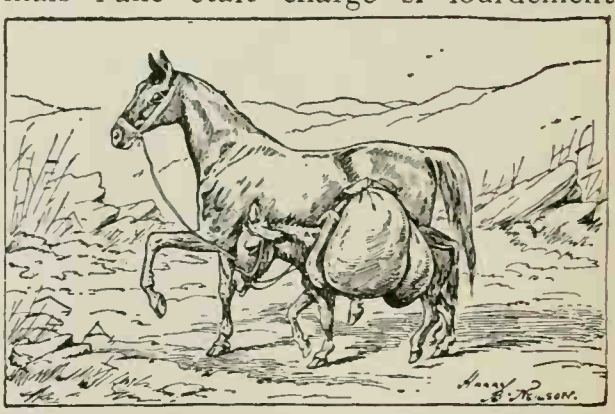
Finalement, l'avocat fut obligé de renoncer à l'espoir de traverser la rivière et il reprit le chemin de sa maison. Il avait si faim maintenant que lorsqu'il arriva près des poires sales qui étaient au fond du fossé, il fut heureux de les retirer, de les essuyer aussi bien que possible, et d'apaiser sa faim en les mangeant.

Qui ne gaspille pas n'a pas de besoins.

LE CHEVAL ET L'ÂNE

UN cheval et un âne voyageaient ensemble sur une route, et l'homme qui les possédait les suivait.

Le cheval n'avait rien sur son dos; mais l'âne était chargé si lourdement



qu'il pouvait à peine avancer. Il pria donc le cheval de l'aider en portant une partie de sa charge.

Le cheval était méchant et égoïste, et refusa son aide si bien que bientôt le pauvre âne tomba épuisé sur la route et mourut. Le propriétaire des deux animaux essaya d'alléger la charge de l'âne, mais il était trop tard. Il prit donc toute la charge et la mit sur le dos du cheval, avec la peau de l'âne mort; ainsi, l'égoïsme du cheval, en refusant de rendre un petit service, ne lui rapporta qu'un surcroît de travail et de peine.

Nous ne gagnons jamais rien à être égoïstes et malveillants.

TALES OF THE INDIAN MUTINY

CONTINUED FROM 4746

IN the great Indian Mutiny, which took place in the last century, many heroes performed brave deeds. Here are two splendid acts of deliberate self-sacrifice, both of them done at the beginning of the outbreak.

The mutiny began at Meerut on May 10, 1857, when, after murdering their British officers, a number of sepoy regiments marched to the great city of Delhi, the old capital of the Mogul Empire.

In the morning the mounted troops were seen approaching Delhi. The rumor was quickly flying from mouth to mouth that the army had risen against the British, and that the white man's rule in India was at an end. The troops poured in; the mob was soon raging through the streets seeking for Englishmen to kill.

In the telegraph-office was a young clerk. He made no attempt to escape, but stood coolly by his instrument, flashing his warning along the wires to other parts of the Punjab. The words of his message show his coolness: "The sepoys have come in from Meerut, and are burning everything. Mr. Todd is dead, and, we hear, several Europeans. We must shut up." The wires had hardly carried their message when the mutineers broke in and cut him down.

Another deed worthy to be remembered here is that of Lieutenant Willoughby and his eight gallant comrades, who were in charge of the great powder magazine where there was a huge store of gunpowder and ammunition. The mutineers were certain to seize this at the first chance, and to make deadly use of the powder. The place was very strong. Even nine men—there were no more—might hold it for some hours; help *might* come. But if not—well, it was better that the magazine should be blown up and its defenders perish than that it should fall into the hands of the mutineers.

So those gallant men placed the guns they had where they could be used with best effect, and laid a train of powder from the magazine itself to the courtyard where they must fight. One, named Scully, was in charge, with orders to fire the train if he received the signal. Soon the mutineers were swarming round; but the defenders paid no heed to a demand for surrender. Ladders were planted against the walls, yet the little band within poured so hot a fire on the assailants that they were beaten off again and again.

But the ranks of the enemy grew thicker and thicker. No help came. And now the enemy were crowding up the ladders; in a few moments they must force their way in. Then suddenly there was a terrific roar, and a huge column of smoke spouted up to the sky. The signal had been given; Scully had fired the train. The magazine and its assailants had been

blown to fragments. Scully died where he fell. The only wonder is that the rest of the defenders survived, and five of them received the Victoria Cross; Willoughby, their gallant leader, was wounded, and died soon afterwards in Meerut.

Another brave man was Golab Khan, a servant of Mr. Greathed, the Commissioner at Meerut. When the mutineers attacked Mr. Greathed's house, the family were in great danger. Then, to save them, Golab Khan risked his own life, for he went out to the mutineers and said that if they would come with him he could show them where the sahibs, as the natives called the white people, had hidden themselves. And by thus tricking the mob, and leading them from the house, he made it possible for the British Commissioner and his family to escape, though he himself would certainly have been murdered if the mutineers had found out that he was leading them astray.

THE SLAVE WHO SAVED HIS MASTER

ABOUT the time of the French Revolution there were uprisings of the people in other countries besides France, attempts to overthrow governments and to get equal rights for every man.

The spirit of revolution touched the beautiful island of St. Domingo, in the West Indies, where dwelt French creoles and their slaves who worked in the coffee, sugar, and other plantations on the island. A decree arrived from the National Convention in Paris that there should be equality of blacks and whites on the island. This the French creoles refused; but the slaves rose to claim their rights, and much bloodshed followed, until, in the end, the negroes got power over the island.

In the dreadful story of that struggle a name that is remembered with honor is that of Eustache, a negro on a sugar plantation. Though an ignorant, untaught man, he was by nature very intelligent, simple-minded, and good, with a high standard of duty.

When the slaves rose against their masters, and massacred them, he saved the lives of fully four hundred white people, yet did not betray his fellow-negroes. He helped his own master, Monsieur Belin, on board a vessel sailing to the United States, so that he might escape from the island, and, regarding himself as still his slave, he also boarded the vessel. An English ship captured the boat, and though the sailors were a rough lot, they let the negro have his liberty. Eustache took advantage of this to amuse them and divert their attention while he freed and armed the prisoners, who then put their captors under hatches, and sailed for Baltimore. There Eustache got work, but gave what he earned to white refugees from his native island. Then, when his master, thinking all safe, ventured back to the island, Eustache went with him. But the lives of the French were still in danger, and Monsieur Belin had to flee to the shore again. Eustache lost sight of him, but managed to hide some of his property; and when he did discover his master, he got both property and master safely on board a vessel which also happened to be sailing for Baltimore.

One of other numerous acts which show the negro's devotion to that same master is his learning to read. Was ever a more generous motive for it than this? Finding his master was troubled by weakening eyesight, Eustache got someone to give him lessons in reading, secretly, at four o'clock each morning, so that later he was able to interest and amuse his old master by reading to him.

It need hardly be said that Eustache's grateful master freed him, and left him money, which Eustache well knew how to use to help people in distress, though he himself, that he might have the more to give, lived on his earnings as a cook.

There were many people who found a real friend in the good-hearted negro. He would buy tools for poor workmen, apprentice penniless boys to trades, and find women to nurse and take care of little children. The fact that a man, woman, or child was in trouble was enough to rouse the beautiful spirit of benevolence and unselfishness in this man, a spirit that was inspired by the service of God; for when praised for his deeds, all that he could reply was that he was not doing them for man, but for the Master.

THE NEXT GOLDEN DEEDS ARE ON PAGE 4973.

Forks and spoons at various stages of their manufacture with the dies by which they are stamped out.

A TALE OF A KNIFE AND FORK

CONTINUED FROM 4703

FOR ages and ages men never dreamed of having knives and forks. The first sort of knife that they used was probably the sharp edge of a shell, gathered on the beach where they caught the shell-fish which formed their food. By and by they improved on this, and made knives and axes and spear-heads of hard flint stones.

The men of the Stone Age used their flint knives for cutting up the flesh of the animals, which they had caught, just as the Indians did when the white men came to America. They did not need forks. The fork, which grew out of the spear, came a long time afterwards. The first forks were used to spear fishes, and were made with three prongs, of which the two outer prongs were barbed. If we want to see what they were like, let us look at a pickle fork, and imagine it to be made, on a much larger scale, of flint or bone, or even of some hard wood.

Later on forks were used in cookery, and then centuries passed before any one thought of using them at the table. It is almost certain that Queen Elizabeth and the ladies of her court ate with their fingers; and it is more than likely that our Mayflower ancestors never saw a fork smaller than those they used in cooking and serving meat.

It is said that the luxurious Venetians used table forks in the eleventh century, and Charles V of France had a few forks for his own use in the fourteenth century; but it is said that forks with which to eat food did not become known in Great Britain until the seventeenth century, when they were brought by a traveler from Italy. Until then, in the king's palace and in the noble's mansion, only the man who carved the joint would have a fork to help him. Even to-day the Persians and the Egyptians eat with their fingers and think that Americans and Europeans are very queer people to prefer using forks, and as we know most of the Chinese and Japanese still use chop sticks.

In England, Sheffield is the great place for cutlery. London and Birmingham once had a big share of the trade, but during the last hundred years the Yorkshire city has so largely increased its manufacture of knives and forks, that it has left its rivals in this trade far behind.

CUTLERY MAKING IN AMERICA BEGAN IN NINETEENTH CENTURY

Germany has long been noted for its cutlery, which is chiefly made in

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Solingen, a town near Dusseldorf, which has been famous for centuries for its swords.

It is probable that some knives were made in America in the early days of its settlement, but if so their number was small. The making of cutlery in sufficient numbers to term it an industry, was not commenced until the nineteenth century. The first cutlery factory in the United States was opened in Worcester, Massachusetts, in 1829. Three years afterward the making of table cutlery was commenced in Maine, and ten years later than that the manufacture of pocket knives began in Connecticut.

There is not in the United States, as in England, France and Germany, one great manufacturing centre for cutlery. A good deal is made in the states of Massachusetts, New Jersey and New York, and there are also factories in New Hampshire, Connecticut, Ohio and other states.

MANY KINDS OF CUTLERY MADE IN THE UNITED STATES

The ordinary silver plated knives and forks, which we use so generally, are made in the United States. So are very large numbers of pocket knives, a large proportion of the scissors that we use, and a great many other things that come under the general name of cutlery. Some of our fine scissors and a great many surgical instruments come from abroad, and immense quantities of very cheap knives and scissors have until recently been sent to us from Germany, where they are made at a very low cost.

Until recently cutlery making in Europe has been almost entirely what is known as a cottage industry, and although there are now some large factories in Solingen, a large proportion of the cutlery produced there is still made in the homes of the men. A different system is followed in Sheffield. Here, too, there are some large factories, but in much the larger number of cases, knives or scissors or surgical instruments are made in small establishments where only a few men are employed. Except in the large factories, little expensive machinery is used, but the small manufacturers, or "small masters," as they are called, generally make their knives from steel blanks which have been forged out in large establishments. The use of these blanks saves much time in manufacture.

THE MEANING OF THE TERM "COTTAGE INDUSTRIES"

"Cottage industries," of which we have spoken, is a term given to trades which are followed by men and women in a room in their own homes, or in a small workshop built in a yard or garden. Sometimes these workers are able to sell their goods direct to merchants. As a rule, however, work is given out to them by large manufacturers, or dealers who find they can get it done more cheaply in this way than if they had to keep up a very large establishment of their own.

In the United States, where cottage industries never gained a strong footing, cutlery has from the first been made in factories, and more machinery, such as steam, or electrically driven forging hammers, dies and grinding wheels, is used. Still, a great deal of hand work is necessary to make really good cutlery, and even for the processes in which machines are used, skilful workmen are needed.

The blades for cheap knives and razors and scissors are stamped out by dies. For the better cutlery, however, the steel is cut into proper lengths, and then forged, or beaten out, by heavy machine-driven hammers until it has been made sufficiently thin. After that has been done they are hardened, tempered, ground, and fastened to their handles; they are polished until they shine like mirrors, nickel or silver plated, sharpened and finished. The cheaper silver plated knives, which are not very sharp, and are not very flexible, are cut to the length of the knife, and forged in one piece in which the handle is included.

THE MAKING OF SHEARS AND SCISSORS

It may surprise you to learn that the blades of many of our shears and scissors are made in two pieces. Very fine scissor blades are made in one piece of fine steel and are often forged by hand. Only skilful workmen can make these scissors; the making of the "eyes" in the handles is especially difficult. Hand made scissors are naturally expensive, and a cheaper way of making the large scissors and shears used by tailors and other workmen, has been devised. The handles and backs of the blades of these implements are made of soft steel, which is brought to a white heat, and forged with heavy hammers. It is then cut with dies into the shape of handles and blades.

MAKING AND TEMPERING A KNIFE BLADE

This man is stamping knives, by means of a die, from lengths of steel which have already been forged into the correct wedge shape needed for a knife, a little thicker at the back than in front.

After the knife is cut, it must be tempered. For this purpose, the steel is brought to a red heat, and then suddenly cooled. Here the blade is being heated.

Two pictures copyright, Press Ill., Service, Inc.

After the knife has been tempered by bringing it to a red heat and then plunging it into cold water or oil, it is placed upon a flat stick hollowed out for the bolster and ground as we see here.

Much care is taken in cutting up ivory tusks for handles, as ivory is very valuable, and the tusks in this picture are worth many dollars. This man is sawing tusks into proper lengths for knife handles.

When this is done, a thin plate of very fine steel is welded to the front to form a cutting edge. Afterward the blades are finished and fitted in pairs, polished, nickel plated and carefully fastened together, ready for use.

The making of knives and scissors, even when machinery is largely used, is very complicated and includes many processes. The steel, which must be very hard, must be carefully forged. It must be tempered to make it pliable, ground to make it sharp, and after it has been hammered, and beaten and ground it must be polished so that it will keep its brightness.

Knife handles are made of different substances. Horn, bone, ivory, tortoise-shell, celluloid, wood, silver and even gold are all used, and putting the knife into its handle, or hafting the blade, is a special trade. The best knife blades, like the best scissors, are hand-forged, or beaten out from a thin bar of steel of the thickness of the back of the blade. Scissors must be so carefully put together that the blades will meet and pass each other at exactly the right angle to enable them to shear through the substance that they are to cut. Sharpening is always done by hand, and to give the knife or scissors blade a proper edge, it must be held against the sharpening stone at a particular angle.

All this means a great deal of work, and you will not be surprised that the knife that you got on your birthday, or at Christmas, was put through at least a hundred different processes in the course of its manufacture.

How our spoons and forks are made

Some spoons and forks are made of silver, some of the very cheap ones are made of brass, but the larger number are made of an alloy composed of certain proportions of tin, copper and zinc. Spoons and forks are all pressed into shape and cut with dies, and are then carefully polished and cleaned. After this has been done, those that are not made of silver are silver plated.

For the purpose of silver plating our forks and spoons, a bath is prepared in which silver is dissolved by the aid of chemicals. The forks or spoons are suspended in the bath by copper or silver wires. They are hung in such a way that they are covered by the solution, and can be moved about in it. Then electricity is turned on, and by its means the silver is made to leave the chemical solution and adhere to the metal of which the spoons or forks are made. An interesting thing is that the anode, or positive pole, through which the electric current is sent into the bath, is made of silver. The silver of the anode is gradually broken down, or dissolved, by the current and is added to the solution, so that although the silver is constantly leaving it to cling to the spoons or forks, the bath always holds about the same proportion of the precious metal. Unless the metal in the objects to be plated is exquisitely clean, the silver will not cling to them, and to make them ready for the coating, they are washed in chemicals before they are put into the bath.

After they have been taken out of the bath they are put through a number of processes, and when they are finished and packed in tissue paper, they look almost as if really made of silver.

Not very many years ago, all table forks were made of steel, and indeed, in some places steel forks are still used; forks for campers' use, for instance, are nearly always made of steel. Carving forks are made of very fine steel, and as much care must be taken in their manufacture as in the manufacture of knives.

The first spoons were probably just shells picked up on the shore, and something very like the shape of shells has been kept in spoons ever since. In the tombs of the Egyptians, spoons of wood, stone and ivory have been found; probably the poorer people among the Greeks and Romans had to be content with wooden spoons, but people of wealth used bronze and silver. In the Middle Ages, spoons were made of wood, or bone, or tin, and, as you know, wooden spoons are still sometimes used in cookery. At the end of the Middle Ages, silver spoons were made for very great people, but it was not until silver became plentiful in the nineteenth century, that people of ordinary means could afford to use silver spoons on their tables. Large numbers of spoons are still made of tin, or of iron roughly coated with tin, but these spoons are stamped out with dies, and finished in the cheapest possible way. Some spoons are now made of aluminum.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4885.

PUTTING BLADE AND HANDLE TOGETHER

This man is cutting stag's horns into handles for carving knives and forks. Stag horn is also used largely for boys' pocket knives and large clasp knives.

First three pictures copyright, Press Ill., Service, Inc.

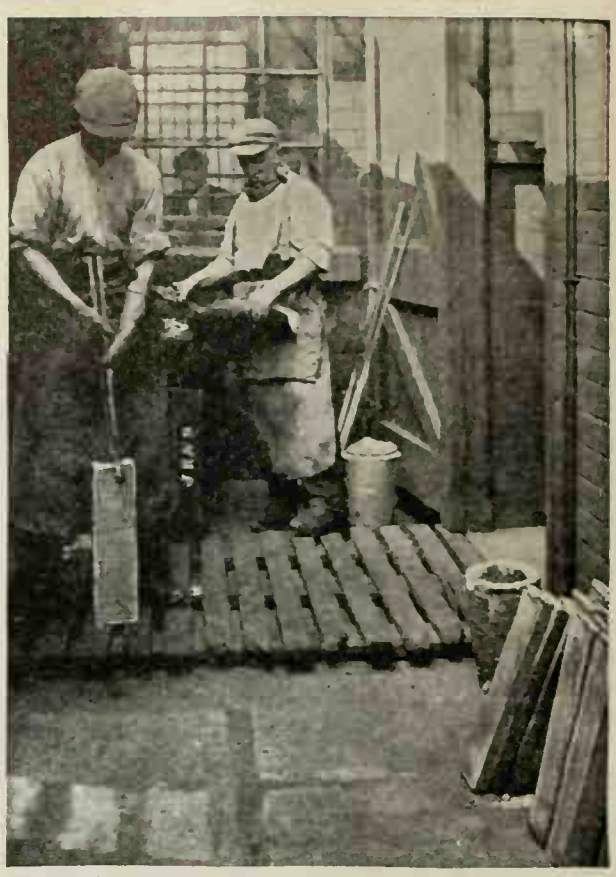
This man is polishing stag horn handles on a wooden wheel, which is covered first with leather and then with a mixture of emery and glue. After the polishing, each handle is fitted with a metal ferrule.

This man is fitting a handle to a carving steel. You can here see plainly the rough tang which runs into the handle, and the raised part or bolster, which fits tight against the ferrule.

After the handle has been put on, the blade is whetted or sharpened, to a keen cutting edge, on a fine wheel. The blade is then burnished and polished or plated, and the knife wrapped in tissue paper.

STAMPING OUT THE METAL FORKS

The making of a silver-plated fork is different from the process of making a knife. Here we see the melting-house, where the metal that will be turned into forks is melted and poured into molds as shown.



When the liquid metal becomes solid, it is taken out of the molds in the form of slabs, known as ingots. In this picture a workman is holding an ingot, while others rest against the wall on the right.

The metal is now rolled out, as though it were putty, by the machine shown here. Then it is cut into strips about the width of an ordinary fork and again rolled, one end being made thinner than the other.

These strips are now placed in another machine, that stamps out the rough shape of the forks, with the prong end quite solid, as can be seen by the shapes lying in the box at the side of the machine.

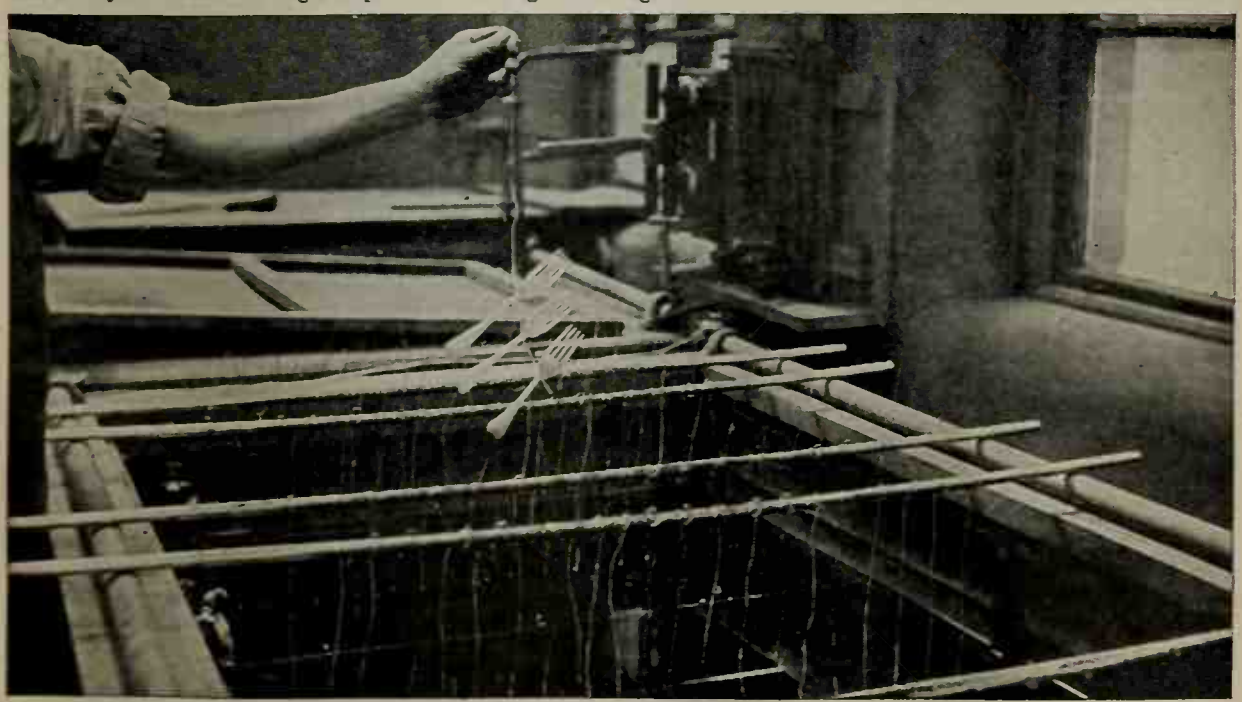
SHAPING THE FORKS AND SPOONS

The process of cutting the prongs is called pronging. When these are roughly stamped out, as is being done in this picture, a strip of metal is left at the tips of the prongs in order to keep these together.

Up till now the fork is flat, but at this stage the handle and prongs are bent, or curved, into the shape of the forks we use. This is done by letting a heavy hammer and die fall upon the metal shape.

This picture shows us how the bowl of a spoon is shaped in a way similar to that in which the forks are curved. The heavy hammer that does the shaping is worked by the man holding a rope in the background.

After curving the fork, it is clamped in a vice, and the metal strip that joins the prongs is filed away. Next it is buffed, or made smooth, by being pressed against leather wheels dressed with sand and oil.



Now the forks are suspended in the magic bath that gives them a silver coat. This is called electro-plating, and the picture shows how the forks are suspended. They are left in the bath a certain time to receive their silver coat, and when taken out are a dull white colour. By burnishing and polishing they are soon made shiny and ready for the table. Although simple in theory, electro-plating needs great skill and experience.

HOW SCISSORS ARE MADE

Pictures of scissors-making courtesy of J. Wiss & Sons Co.

The blades of very fine scissors and surgeons' scissors are made by hand from very hard steel, but the blades of the shears and scissors in ordinary use are made in two pieces. The handles and backs of these implements are made of soft steel, which is forged with heavy hammers and cut by means of dies.

Soft steel will not keep a sharp edge, and after the frame has been forged, a piece of very fine, hard steel is welded to the inside of the blade to form a cutting edge. This man is welding the pieces together.

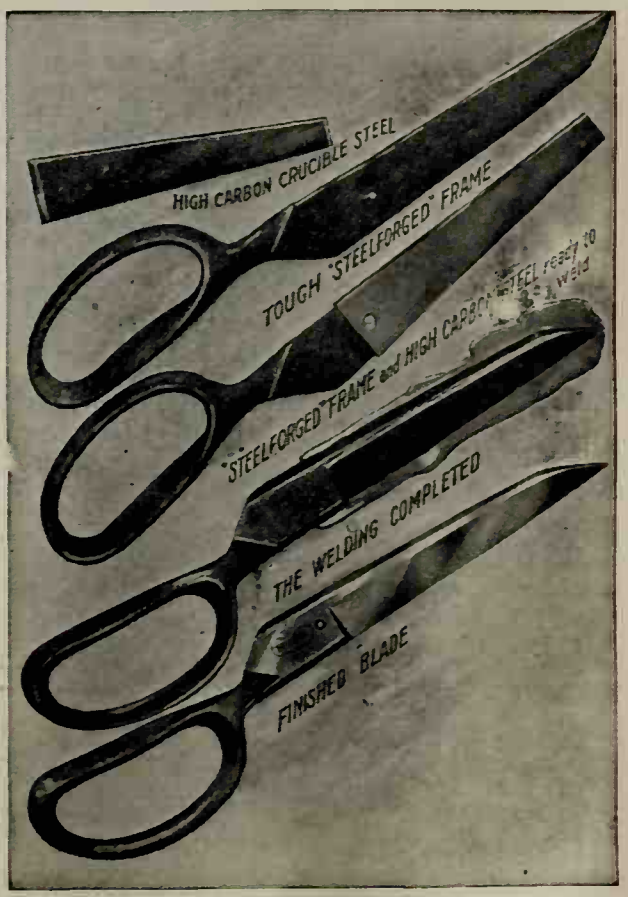
When the welding has been done, the blade is trimmed and the screw hole carefully drilled. The blade is then hardened by heating it and chilling it. When this has been done, the steel is tempered.

STRAIGHTENING AND FINISHING SCISSORS

After the welding is done, our shears go through the same processes as one-piece scissors. This man is straightening a tempered blade by tapping it lightly with a hammer. This is called peening.

The blades are still rough, and they are now carefully ground until they are quite smooth and sharp, and ready for the polisher. They are then paired, and screwed together into pairs of shears, or scissors.

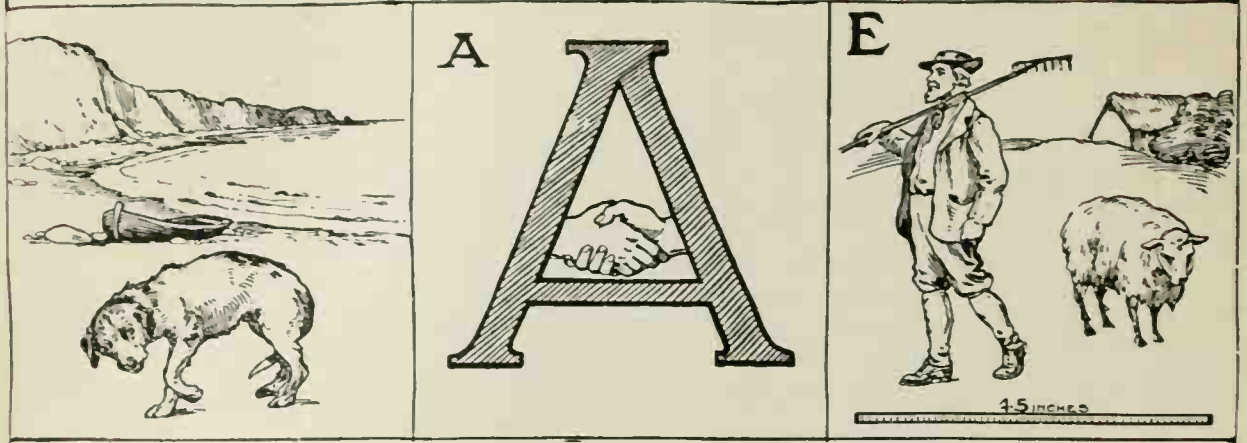
These shears or scissors are now polished as carefully as a knife, and nickel-plated, and as a last step are inspected by men who adjust the blades so that our scissors will cut straight through cloth or paper.


HIGH CARBON CRUCIBLE STEEL
TOUGH "STEELFORGED" FRAME
"STEELFORGED" FRAME and HIGH CARBON STEEL ready to weld
THE WELDING COMPLETED
FINISHED BLADE

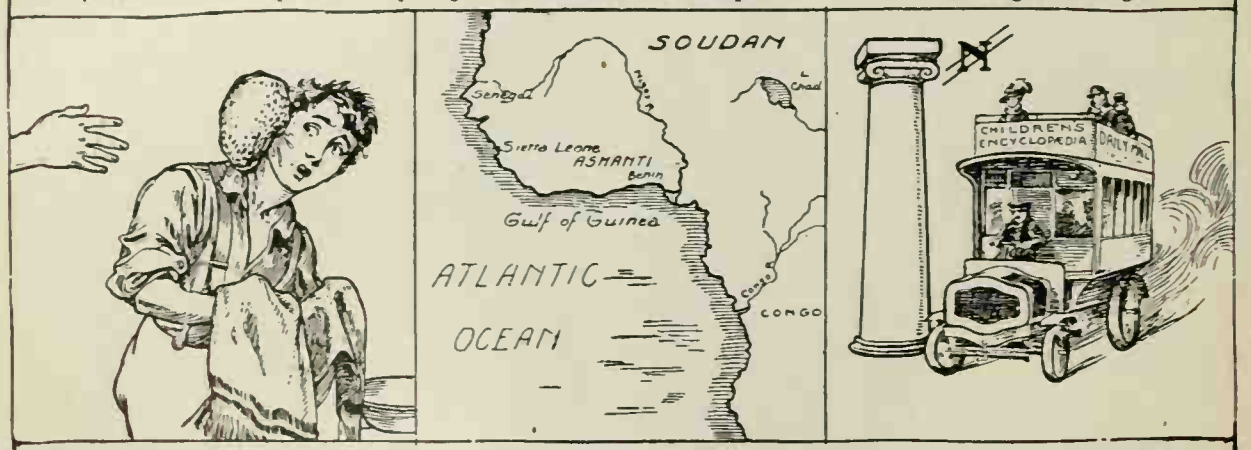
This interesting picture shows clearly the steps taken in the making of a pair of shears. High carbon crucible steel is a very fine, hard steel, which is used to make cutting tools, which need a sharp edge.

PUZZLE PICTURE-NAMES OF FAMOUS MEN

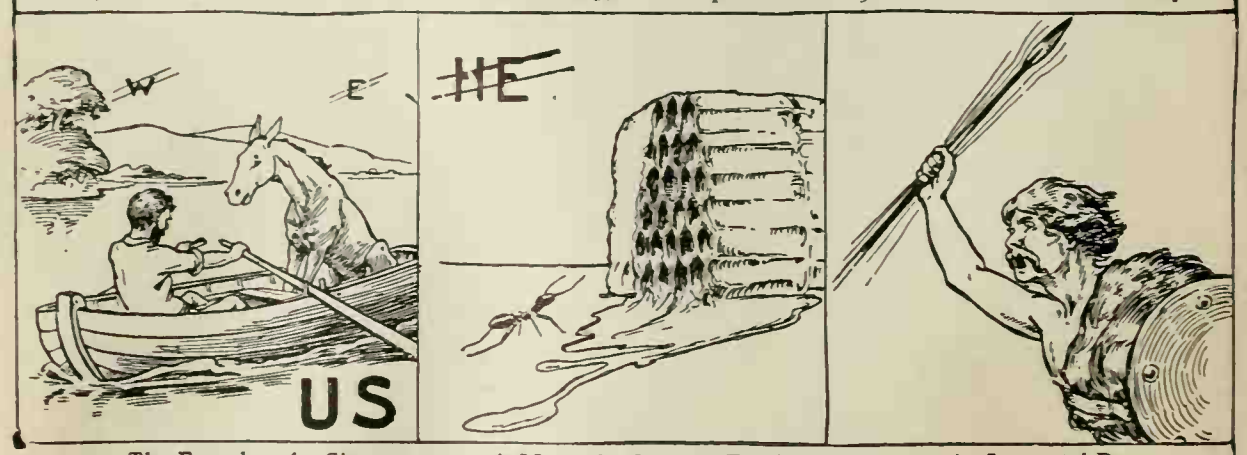
1. A King of Early Rome. 2. A Great English Admiral. 3. A Real Robinson Crusoe.



4. An African Explorer. 5. The Mother of an Emperor. 6. A King of Portugal.



7. A Great Discoverer. 8. An Australian Explorer. 9. A Discoverer of a Country.



10. The Founder of a City. 11. A Man who Lost an Empire. 12. An Immortal Poet.

The pictures on this page represent names of famous men whose stories are told in the Book of Knowledge. Their names appear in the "Book of Men and Women" and the answers are on page 4829.

WHAT MAKES A WHIRLPOOL?

CONTINUED FROM 4696

WE make a little whirlpool when we stir our tea, and a whirlwind moving above water will set it whirling for a time. But in many parts of the world there are great whirlpools which remain from day to day or from century to century. The cause of them is the meeting of two currents of water, especially rapid and strong currents. When we take a top or a ball and hold it between our hands and spin it by pushing one hand from us and pulling the other hand towards us, we really see exactly how two opposing currents may treat the water where they meet.

There is a great whirlpool below the falls of Niagara; another, about which wonderful stories have been told, is the famous Maelstrom off the coast of Norway; but the most famous of all is the whirlpool called Charybdis, in the Strait of Messina. We know that this whirlpool existed thousands of years ago, but the region is very liable to earthquakes, as everyone now knows, and it is said that the position of Charybdis has been altered in consequence.

Not far from where Charybdis used to be there was a great rock very dangerous to sailors; its name was Scylla. It was very difficult for small ships to pass between the whirlpool and the rock without being engulfed in the one or wrecked upon the other, and to this day, when a man has to steer his course of life carefully between two dangers, we say that he is between Scylla and Charybdis.

HAS A MICROBE SMALLER MICROBES ON IT?

The more we study the world, the more necessary and right does it appear to ask, and to try to answer, such questions as this. For our notions of great and small really depend just on what happens to be our own size; and that proves nothing.

The farther we go in the great world, the more we find, and the same is true the farther we go in the little world. The whole universe known to us may be only an atom in the eyes of God, and before we decide that there is a limit in the direction of smallness, we must try to prove it.

But we have good reasons for allowing ourselves to say "No" to this question. When we study the size of microbes, we study, also, so far as we can, the size of the molecules, or particles of the chemical substances that make up their bodies. And we may try to compare the two sizes. Now, when we do so, we find

that microbes are really so small that probably independent living things could not very well be much smaller than they are. But, so far, we can only be fairly certain about the answer to this question.

It is well to remember how very small microbes may be—for instance, less than one twenty-five thousandth part of an inch across. This is, of course, very much smaller than the smallest kind of animal or plant that we can see. So the answer to our question would be different if it were: Does a tiny insect have microbes on or in it?

It is found that all sorts of living creatures which, not long ago, were thought to be the smallest kinds of life may house countless microbes. Tiny insects, smaller than an ant, for instance, may have vast numbers of microbes living on or in them; and that sometimes is how we get serious illnesses. These insects bite us, and they leave a few of their tiny microbes behind.

WHEN WE RUN INTO A WALL, DOES THE WALL PUSH US BACK?

Sir Isaac Newton discovered three laws of motion, the second of which deals with this question. Newton's second law is that "action and reaction are equal and opposite," and wherever action happens, we find that this is true.

When a bullet is fired forward from a gun, for instance, the gun gives a kick back, which we call its recoil, and that is its reaction; and if we could compare the weight and the speed of the gun backwards with the weight and the speed of the bullet forwards, we should find that action and reaction were not only opposite, but also strictly equal.

When we run, with elbows bent, we notice how the elbow goes forward as the foot of the same side strikes the earth backward. That is another example of the same thing.

If we push a wall, the wall must push us, and the amount of pressure we exercise on the wall is exactly equal and opposite, in accordance with Newton's law, to the pressure which the wall exercises on us when we run into it.

WHY DOES A BRIDGE SWAY IF MANY PEOPLE KEEP STEP UPON IT?

The swaying of the bridge is really the same as the swinging of a swing, or the to-and-fro movement of the pendulum of an old-fashioned clock. All these *vibrations*—a word which simply means tremblings—obey the same law. Other instances of the same kind of thing may be found in cases where a huge rock, perhaps, is balanced so that if we press against it at the right intervals it can be set rocking, though no living man could move it in an ordinary way.

The secret lies in the time when we apply our force. The bridge is set swaying because many little forces are applied at the same moment. The swing swings well because we give it a little push at just the right moment.

It is the same in games. People think that the man who hits hardest or farthest at tennis or baseball is the best hitter, but that is not quite the case. The best hitter is the best "timer," the man who times the ball, and applies his force at exactly the right moment. Twice the force applied a second sooner or later than it should be would not produce half the result.

HOW LONG HAS LIFE EXISTED ON THE EARTH?

Many answers have been given to this question, but we cannot be certain of any of them. Plainly, in order to answer it, we must dig down till we find remains of the earliest life on the earth, and then we must find how long it is since that part of the earth's crust in which we find the remains was formed.

All this is easier said than done. When it comes to the remains of the very simplest forms of life—and the first forms were certainly very simple—we are often in doubt whether what we find was really made by life at all. Again, we have reason to believe that the very first living creatures would leave no records of any kind behind them.

The simplest animals and plants now existing, which are very likely far less simple than the first forms of life, could not possibly leave behind any traces of themselves. So probably life is much older than the oldest records of it that we can find. How much older, we can guess to some extent, for at least we may be sure that life came into existence after the making of those deep rocks which were certainly formed by the tremendous power of intense heat.

When we have got back to proofs of heat at the earth's surface, so great that the rocks were melted, we may be sure that we have reached a time before life.

The total age of the rocks laid down since that time is not easy to guess, and we have learned since the discovery of radium that all the old guesses made by men of science allowed far too short a time.

At least, we may be quite certain that life must have existed upon the earth for scores, and more probably for hundreds, of millions of years.

OUGHT WE TO BE AFRAID TO DIE?

No animal is afraid to die, but that is because it does not think of the future and cannot know what death is. A child does not *naturally* fear to die, though we can easily teach it to be afraid. For ages past many men have made it their business, for one reason or another, to teach people to be afraid to die. This applies only to our part of the world. In mighty Asia, where the greater number of all mankind is still to be found, men are not afraid of death. But in our part of the world they are, and for two reasons.

The first is that we are usually taught that death is very painful. This is false. As a rule, the only painless part of a painful illness is the death that ends it. Dying is no more painful than going to sleep. In both cases we slowly lose our feelings, because the amount of carbon dioxide and other substances in the brain prevent it from feeling any more. Nature is most merciful in this respect. It is the rarest of events for a death to be other than a quiet, peaceful going to sleep, from which there is no waking here—a scene painful to the lookers-on, but not at all to the dying person.

Then men fear to die because of "the dread of something after death." Only the wisest of us, and those who believe in their hearts what they profess to believe with their lips, know that "To the good man no evil thing can happen," as Socrates, of whom we read on page 1326, said before they poisoned him. Another great and good man, Spinoza, about whom we read on page 4632, said many words of eternal wisdom and truth: "The free man thinks of nothing so little as death, and his wisdom is a meditation not of death, but of life."

WHAT MAKES US GROW?

We cannot fully explain growth, because growth depends upon life, and we cannot fully explain life; but there are certain laws of growth which we know. The first is that, to begin with, our food makes us grow; this is true of all growth everywhere, whether of a cabbage or a child. Growth is, among other things, the addition of new material to the body.

Now, though life is so marvelous, it obeys the laws of Nature, and we have proved that all living things obey the law that matter cannot be made out of nothing. Therefore, the new matter added to itself by the living body is derived from the food; and that is why the feeding of living creatures while they are still growing is so very important.

This all sounds as if we understood the whole of growth, but that is far from the truth. For in the case of every human being or animal there comes a time when no amount of food will cause growth. There are laws inside the living body which decide when it shall stop growing and a man of thirty will never get any taller, however much he eats. Even a tree, though it may get thicker as long as it lives, will not grow taller after a time.

Mere adding of matter is not growth. A man who is ill, or who eats and drinks too much and does not do enough work, may get heavier and heavier—perhaps by storing up water, perhaps by storing up fat in his body. But that is not growth. *Real* growth is only the outward visible sign of development, as when an acorn develops into an oak; and the causes of development still lie hidden deep in the nature of life.

WHY DO WE LAUGH?

It is not difficult to make many kinds of machines, such as a mouse-trap or a gun, which will "go off" in a particular way when a certain thing is done to them. If we touch a handle or a trigger or a string, and a certain result happens, it is because the machine is made in that way. Well, our bodies are in many respects made so as to do certain things, when certain things are done to them, and these actions, which go on without ourselves having anything to do with them, are called *reflex* actions. The name suggests that they are replies to certain things, as the gun's going off is a reply to a touch on the trigger.

Now, laughing is one of many instances of reflex action; and so, when we are asked why we laugh, the answer

is that, just as the gun explodes when the trigger is pulled, because it is "made that way," so we "explode with laughter," as is sometimes said, when the right trigger is pulled, because we are made that way. In this, and in all other cases of reflex actions, like crying, swallowing, winking, coughing, sneezing, and so on, it is very important for us to learn what the various triggers are, so to speak, which can set the machine going when they are pulled, or, in other words, what are the causes of things that happen.

This is important because it helps us to put things right when any of these reflex actions go wrong. For instance, if we know that disturbance in the ear may cause a cough, we shall remember to look at the ear when there is a cough whose cause we cannot trace.

Is it good for us to laugh?

The old saying, "Laugh and grow fat," suggests that it is good for us to laugh, though perhaps growing fat is not the best proof of that. At any rate, it is perfectly true that we do derive some benefit from laughing. To put it more generally, it does our health and lives good to be happy, whether we actually laugh or not. As Herbert Spencer put it long ago, "Every pleasure tends to raise the tide of life, and every pain tends to lower it."

This can be proved in detail by careful study of the different things that the body does. For instance, happiness strengthens the beat of the heart and deepens the breathing. If food is eaten with pleasure, in good company, and with an easy mind, plenty of the digestive juices pour into the stomach, and the fluid, when examined chemically, is found to contain a high proportion of ferments by which digestion is done.

On the other hand, digestion does not go on nearly so well if we are not happy; and it is known that often, when people are really worried or unhappy, either the stomach will not keep the food at all, or, if it does, no digestion occurs. In great sorrow it may actually be impossible to swallow even liquid foods.

Laughter has a special value of its own, for it is a kind of exercise of the most important and valuable muscles in the body—the muscles by which we breathe. And this extra deep breathing not only exercises the muscles of the chest, but also, indirectly, exercises the heart. It also means that more oxygen passes into the blood, and that the blood, richer than usual in oxygen, is carried more quickly than at ordinary times to the various parts of the body.

Is it bad for us to cry?

Crying may be good or bad for us. When some terrible sorrow has come upon people, they may be so deeply affected that the brain refuses to do what is natural for it in such circumstances, and it may be severely injured. If by any means the person can be got to cry, he or she will be relieved, and may be able to sleep; but if that relief is not got by crying, the person may be unable to eat or to sleep for a long time, and the brain may be so much injured that it never properly recovers. One of Tennyson's most beautiful poems deals with this subject. It begins:

> Home they brought her warrior dead:
> She nor swoon'd, nor uttered cry:
> All her maidens, watching, said:
> "She must weep or she will die."

Then the poem goes on to say how, when everything else had failed to make her weep, a wise old "nurse of ninety years" brought to her her child; and then at last she wept and said:

> "Sweet my child, I live for thee."

But cases like this are quite the exception, and there are other cases when crying does us no good at all. On the contrary, it disturbs the most important duties of the body, especially by its effect on the part of the brain which controls our breathing.

Everyone knows that when we cry our breathing is made irregular with many shallow breaths that do us little good, and then long, sighing ones to try to make up for them. Also, we find that the heart's beating is apt to get irregular when we cry, and many people after a serious attack of crying can neither eat nor sleep. A little crying at times does not hurt a baby in the least.

Why are not lead, coals, and diamonds all the same price?

Lead is a metal and a true element, different from everything else. For some stupid reason, pencils filled with a certain kind of carbon are called lead pencils. Carbon, like lead, is a true element, and it is found in many different forms. The kind of carbon put into so-called "lead" pencils is called

graphite, from a Greek word meaning to write. It is made up of a vast number of very small crystals of a special shape; but these crystals are not particularly hard, and so they can be rubbed down on paper. Graphite is found in nature, and can be made without difficulty from other kinds of carbon.

Coal and diamonds are also made of the same element—carbon. It is not difficult, by heating them, to turn diamonds into what is practically coal. The hard crystals make the diamond swell up, turn black, and there is produced a shapeless black mass of charcoal.

Now, the price of things does not go by their use. Coal and graphite are far more useful than diamonds. But diamonds are difficult to find. Their price is kept up by the fact that the supply of them is nearly all in the hands of one company. Large ones are very rare, and are much sought after. If they were less liked, they would be cheaper. Coal, charcoal, and graphite can be turned into small diamonds which no one cares to buy. The price of diamonds would fall to the price of pencils if they could be cheaply made from other kinds of carbon.

WHY DOES A HOUSE BECOME VERY DUSTY IF WE LOCK IT UP FOR A YEAR?

The air is simply laden with large and small particles of dust. These are the "motes that people the sunbeam." We see a sunbeam because some of its light is stopped by the particles of dust in the air, and is reflected from them to our eyes. It is really dust that we see when we think we see the sunbeam.

Now, if air is kept perfectly still, these particles of dust will slowly settle. They are not very heavy, as we can understand when we find how readily they are kept up in the air. But, nevertheless, they are heavier than air, and in time they must certainly fall if the air becomes quite still.

So if we pass a beam of light through such a place as a cellar, where the air has long been quite undisturbed, we actually find that it is quite invisible. That is because the dust has all settled down out of the still air in the course of time, and it explains why a house becomes so dusty when it is locked up.

The air being still and unchanged, and no light entering, probably no new dust is made, or very little; but the dust which was in the air simply settles. When it was in the air we did not notice it, but now we do. We breathe in many millions of tiny dust particles with every breath we draw. If we breathe through our noses, the greater part of the dust that is in the air is prevented from reaching our lungs.

WHY DO PLANTS GIVE OUT OXYGEN ONLY IN THE DAYTIME?

The oxygen which plants give out is not derived from any source in themselves, nor does it come up in the sap from the roots. If that were so, it might be given off at night as well as in the daytime. But all the oxygen given out by plants comes from carbon dioxide, which is an extremely firmly-made compound of carbon and oxygen.

There is always a certain amount of carbon dioxide in the air—about three and a half parts in ten thousand parts of air—and this is where the plants get the carbon dioxide from. But the great power with which the carbon and oxygen are united, of course, requires a power at least equally great in order to separate, or to *dissociate*, them, to use the proper word. There is no power in the plant itself strong enough for this, but the tremendous power of sunlight is strong enough, and the plant really plays merely the part of taking the power of sunlight in such a way as to force apart the atoms of carbon and oxygen in carbon dioxide. When daylight fails, therefore, this process must cease.

Though we say that all the plant does is merely to use the sunlight, yet we should also add that this is more than we can do. No matter how strong the light that we use may be, or what devices we employ, we cannot with any amount of trouble separate the elements in carbon dioxide, as every green leaf can do without any trouble at all.

WHY DO RIPE FRUITS TASTE SWEET AND UNRIPE FRUITS TASTE SOUR?

The difference is due to the fact that the chemical substances found in ripe fruit are very different from those in unripe fruit. It is not easy to find out the exact details of what happens, but we know that the ripening of fruit is really a steady series of chemical changes, as definite as if we were going through a process of chemical manufacture.

In unripe fruit, and, indeed, to some extent in nearly all fruit, we find a large number of acids. They are acids in the

strict sense of the word as used by chemists, who are not concerned with their taste, but with their chemical make-up and behavior; and also they taste acid. *Malic* acid, which comes from the Latin name for an apple, is found in sour apples; *citric* acid is found in oranges and lemons and limes.

As the fruit ripens, we find that certain powers in the plant, usually aided by the power in sunlight, cause chemical changes to occur in the fruit-acids. Probably oxygen from the air is combined with the acids, burning much of them away, or, at any rate, completely changing them.

In their places we find, in varying quantity in different fruits, a much more complicated substance than any fruit-acid. This is called fruit-sugar, and the special name of it derived from the same Latin word as the word fruit itself, is *fructose*. It is sweet to the taste, just like other kinds of sugar.

How is it that a man can walk along a wire?

If the question had been, why are we able to stand and walk, though our feet are so small compared with the rest of our bodies, the answer would have been the same. In every case our bodies are top-heavy, and if a man standing on a wide space, or, what is more difficult, a thin wire, sleeps or faints, he tumbles.

This fact shows us that, though the wire-walker is very clever, and does what we cannot do, yet his feat is really no more than a rather more difficult instance of the feat we perform ourselves every day; and the explanation of the one will be the explanation of the other. The wire-walker learns by practice, just as a child does when it learns to walk on the ground, and both learn the same lesson. They use their eyes, their feeling of pressure on the feet, and also other feelings that they get from special places, made for the purpose, inside the skull, which help greatly to tell them exactly where they are.

The wire-walker, if he be very clever, has perhaps a specially good brain by nature for this kind of thing, but he attains his skill through practice, training or education, and the secret of his success is the secret of all the most successful educations—its foundations are laid in youth, when the brain is capable of learning almost anything.

Why does our hand lose feeling after an accident?

There are many kinds of possible accidents which may make the hand dead to feeling for a time, and yet the hand may completely recover. The most marked cases of the kind are easy to understand. Feeling in the hand depends upon its nerves; it depends also, of course, upon the brain, but it is necessary that the nerves shall be there and working properly to carry messages to the brain, as well as that the brain shall be well and able to receive them when they arrive.

An accident made by some cutting instrument may simply cut through the nerves of the hand. It may, for instance, cut through the nerve which we call the funny bone, and then there will be no feeling in just those parts of the hand which gives us pins and needles when we hit our funny-bone—that is to say, the little finger and the side of the finger next to it. The nerve we call the funny-bone supplies the skin in those places, and also along the inner edge of the hand. If this nerve is severed, these parts are dead to feeling.

How does an injured hand recover its feeling?

Though our hand may have been dead for a long time after an accident, perfect recovery may be obtained. As a rule, this requires an operation. The surgeon simply finds the two ends of the cut nerve and stitches them together. At first, this makes no difference at all, but in the course of weeks, as the wound begins to heal, the feeling will gradually return.

What happens is that the nerve-fibres, beyond the place where the cut occurred, have died and are useless, but when the cut ends are sewed together, the nerve-fibres next the brain, which are unhurt because they are still in communication with the nerve cells from which they spring, grow slowly downwards into the old sheaths, and so at last the nerve can do its duty properly.

The invariable rule is that the part of a cut or damaged nerve which is away from the nerve-cells dies, but the part which is next the nerve-cells in the brain, or in the spinal cord, lives, and, if it has the chance, will always grow again along the old lines.

WHY DO FIELDS APPEAR TO MOVE WHEN WE ARE IN A TRAIN?

When we sit still in a train, we notice that, compared with the seats and walls of the carriage, our bodies are not moving, and so we half get the idea into our minds that we are really at rest. Then, as we look out of the windows, we keep in our heads, more or less, the notion that we are at rest, and therefore we argue that the results of the motion, which is certainly going on somewhere, are due to the fields, and so on.

This is one of countless instances where we are deceived, and all these instances teach the same lesson—that our ideas of motion are made of comparison between one thing and another; but which thing is moving, or moving most, is another matter. The proper way of expressing this is to say that all our notions of motion are relative, not absolute.

A train gives us another instance, for we all know that we may be deceived when there is a train on the line next ours. Often we cannot tell which of the two trains is really moving. But by far the most famous and important mistake of this kind that has ever been made is the case of the earth and sun and the stars. In our train, which is the earth, we move every day and night, and the fields of the sky, with their white flowers, the stars and the mighty sun, seem to move across our path and pass us.

We make the mistake the eye makes when we look out of a train; and it cost hundreds of years and vast trouble and many lives to prove that it is *our train*, or the earth, that is moving.

WHY DO WE WANT ALWAYS TO RUN DOWN A STEEP HILL?

If we could see the earth as a great ball, we should notice the hills as places where the surface of the ball sticks out. It is rather like an old composition golf-ball that has grown rough. Now, plainly in such a case anything on the top of a rough place is farther from the centre of the ball than anything lying in the hollow between rough places.

The case of the earth is the same. When we are on the top of a hill, we are farther from the centre of the earth than when we are at the bottom of a hill. The earth's attraction, which we call gravity, is always trying to pull us and everything else as near as possible to the centre of the earth. So when we start going downhill we do not so much drive ourselves as allow ourselves to be pulled by the earth's power.

We notice this best, perhaps, when we coast downhill on a bicycle; but it is just as true when we are on our legs, only that we cannot roll as the bicycle wheels do. So our natural inclination, if we are not afraid of hurting ourselves, is to yield to the earth's pull and run downhill. The natural inclination is really in the earth, perhaps more than in us, as the case of the bicycle mentioned, which has no inclination of its own, shows.

If the load is fairly good, and we are not too heavy and are sure of our feet, we may go downhill very easily and with very great speed, by keeping the upper part of the body well forward, so as not to resist gravity, and by making large bounds rather than running.

WHY DOES FURNITURE CRACK OR MAKE NOISES AT NIGHT?

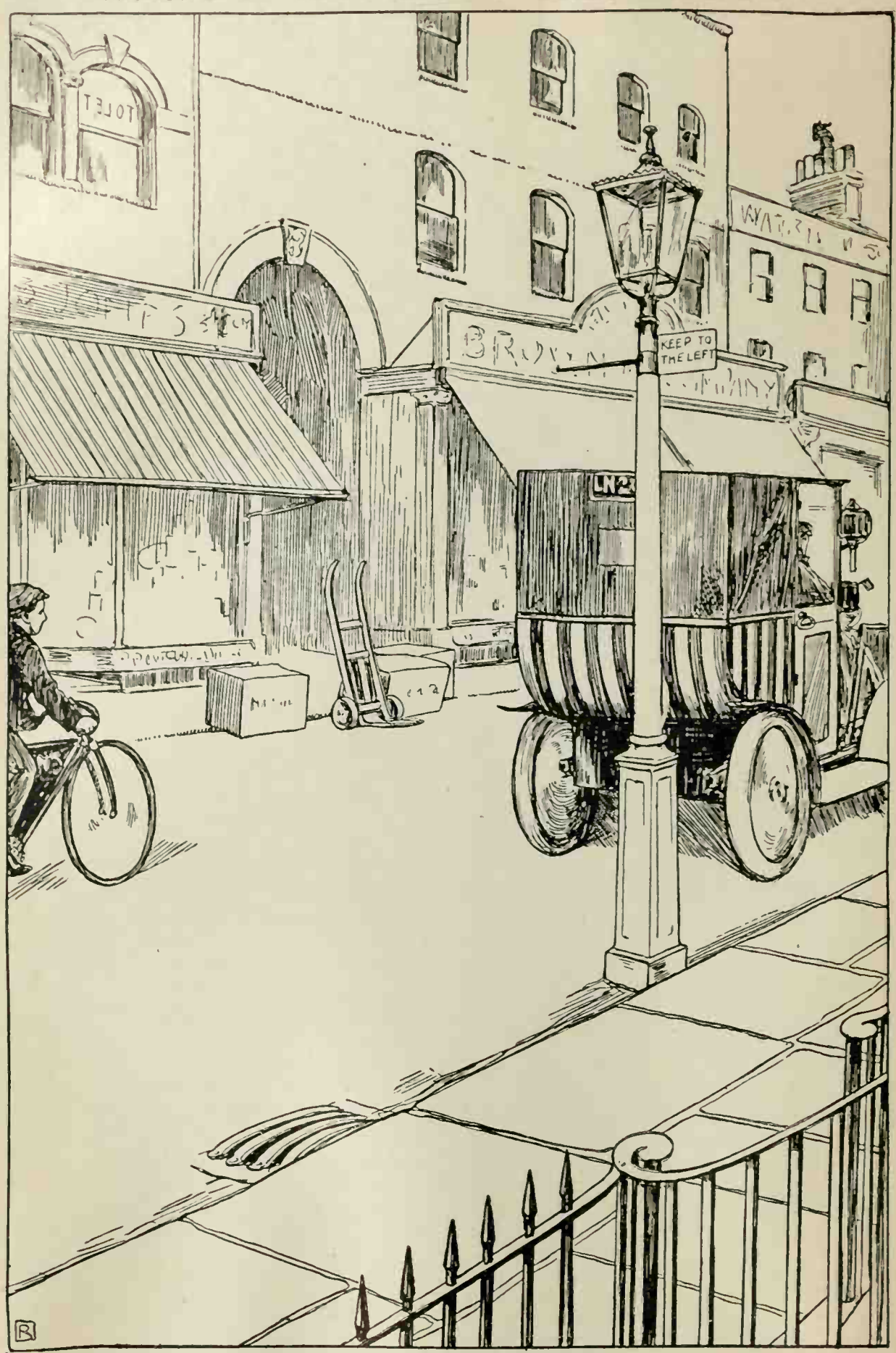
Perhaps we cannot be quite certain that furniture cracks so much more at night than in the daytime. For one thing, there are other noises going on in the daytime which we are more likely to be attending to; for another, it is known that when we lie awake at night in the dark our hearing is more acute than it usually is in the daytime. Still, when all this is allowed for, it is no doubt true that furniture does make strange noises at night, and that is not difficult to understand if we remember that the air has been warmed up, more or less, during the day, and then cools down at night.

The general rule, which is true of wood as it is of most other things, is that things expand as they are heated and shrink as they are cooled. Thus furniture is liable to shrink more or less at night as it cools, and we can understand how different parts may suddenly become adjusted to each other, and so start the waves in the air which make us say that the furniture is cracking.

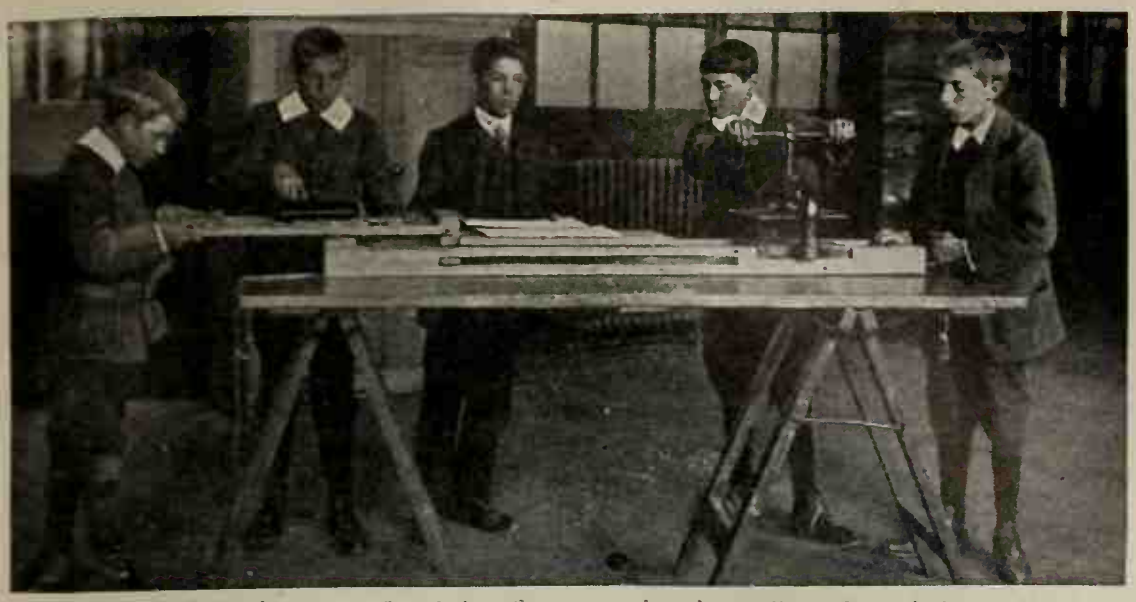
The question of moisture may play a part, too, because as air cools it is apt to deposit the moisture which it could hold in itself when it was hotter, and that moisture is apt to affect the state of whatever object it is deposited upon.

THE NEXT QUESTIONS ARE ON PAGE 4873.

WHAT IS WRONG IN THIS STREET?



When we take a walk in the country or in town, we should make a point of noticing the objects that we pass. This practice is an excellent one for training the mind, and many improvements in city streets had their origin in ideas that have come to people walking along with their eyes open. In this picture the artist has purposely drawn many things incorrectly. A list of the things that are wrong will be found on page 4931.



A group of schoolboys printing their school paper upon a small wooden printing press.

STARTING A SCHOOL PAPER

CONTINUED FROM 4713

A SCHOOL paper cannot well be undertaken by one person alone. There are so many different things to be done, and so many of them call for special aptitude, that the work is best accomplished by a division of labor.

If we are going to run a school paper, we must take care to select our helpers in such a way as to ensure all branches of the work being really well done.

The work can roughly be divided into four main parts, which we may call the writing, the drawing, the printing, and the selling. A school paper may be founded by four friends, each of whom will undertake the charge of one of the above departments. We have said four friends, for much of the success of the venture depends upon the firmness of the friendship which exists between the founders. Nothing demands more unity of action than the production of a school paper.

Let us consider these four friends and see what qualities fit them for the posts they will occupy. The editor is of necessity the chief; he must be a good scholar—so good that none of his schoolboy critics will be able to pull him to pieces. He must also be on fairly good terms not only with his schoolfellows, but also with his teachers. These latter will be of the greatest assistance to him, not only in furnishing occasional articles, but also in influencing the circulation. One of the teachers of a literary turn of mind might be persuaded to look over the manuscript articles submitted, and correct the grammatical blunders which might otherwise be passed over by the youthful editor and so get into print.

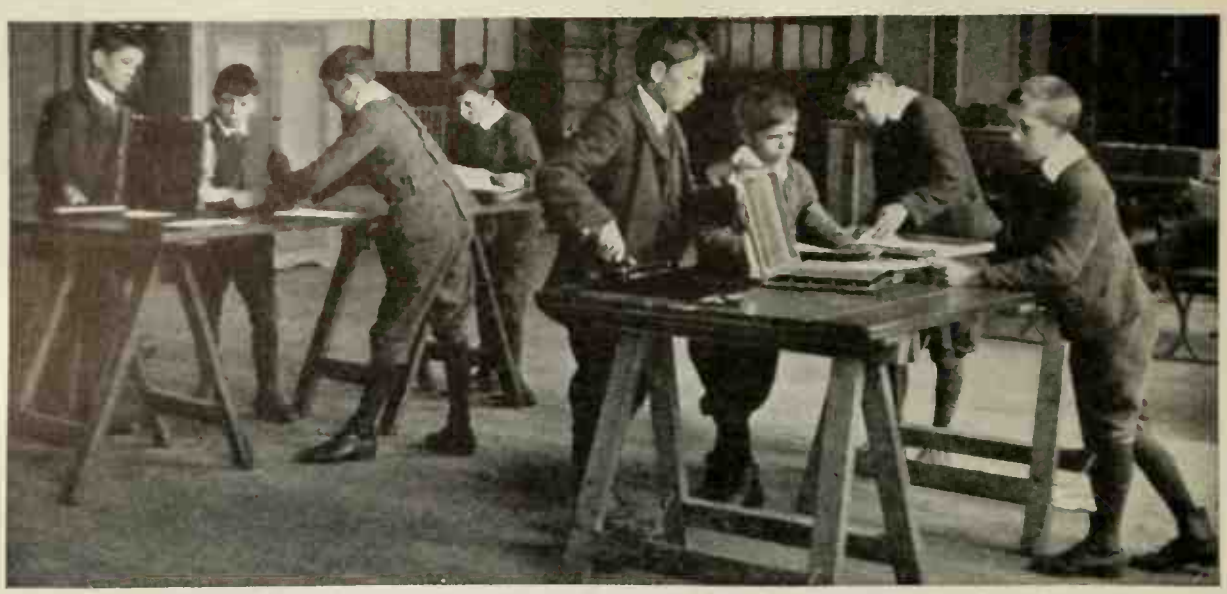
The second position, that of art editor, is nowadays an easy post to fill. Most schools of any size possess a fair share of pupils who can draw well, and from among their number a suitable editor can be chosen.

The third position will be that of foreman printer, and whoever fills this post will generally have the whole of his business to learn. Much of the hard work will fall to his share, so that great care must be taken to choose as printer one who possesses a full share of diligence, and who is really fond of working with his hands.

The fourth editor will be head of the distributing department, and must, above all things, be a genial fellow—one who is on good terms with everyone. He will have to help with the printing, so that he must also be willing to work when needed.

The first question that the founders of the school paper will have to decide will be the method of printing. Printing with type may be impossible because of the expense. If so, some form of duplicator must be bought or borrowed. Should there be such a thing as a school mimeograph, the principal may be prevailed upon to allow its use. Failing this a hectograph will be found a cheap and easy means of reproduction, and will, if rapidly manipulated, give eighty to one hundred clear copies from one original writing or drawing. The hectograph composition can be bought in cans, and when melted may be poured into any shallow tray.

The question of printing being thus settled, arrangements must be made for obtaining paper. Foolscap or other papers used for educational purposes will be found too expensive, and the local newspaper or printing office may be willing to sell the small quantity needed. The size of the



The printing staff of a school paper producing the monthly issue of 350 copies upon a mimeograph.

school paper must be governed by the size of paper you can buy and by the size of your hectograph. Sheets measuring about twelve inches by nine inches will be found both economical and handy, and when folded in two will give a page of six inches by nine inches.

The subject-matter will vary with the taste and capabilities of the staff, but certain regular features will probably be common to many school papers. We have already alluded to the desirability of co-operating with the principal, and this can best be accomplished by offering them a page or two of space for school notes. Few schoolmasters will refuse such an opportunity of awakening outside interest in school doings.

After school notes the most important feature will probably be school sports. These can be supplied by the various captains or secretaries, and in schools where directors take charge of sports a timely article on training, fielding, diving, and so on, will be found of general interest.

Here will be ample opportunity for the art editor to introduce a few sketches. Tiny illustrations in the margins take but little time, and help to make the pages look bright. Nature notes of the month and local history are sure to be subjects which are not only full of interest, but are easily written up, either by enthusiasts or by the editor with the help of a few books from the nearest library. Playground gossip will give opportunity for some harmless fun, but our editor must be careful that the fun does not degenerate into unkindness. He must remember that while we should all be able to stand a joke, it is cruel to continually hold anyone up to ridicule.

Now for a word as to printing. At first it will be as well to write the matter in the form of a book, so that the difficulty of arranging pages is approached gradually. After a time the editor and printer will get to know just what the page will hold, and no difficulty will be experienced. Sketches will be more effective if printed in ink of another color, and, fortunately, hectograph ink is made in several colors.

The future of the paper will depend entirely upon its circulation. The price should be fixed so as to be easily within the spending powers of every schoolfellow, and the distributor must endeavor to secure every boy in the school as a subscriber.

Should the circulation outgrow the dupli-

Here we see the boys coloring the pictures in an issue of their paper that is printed ready for publication.

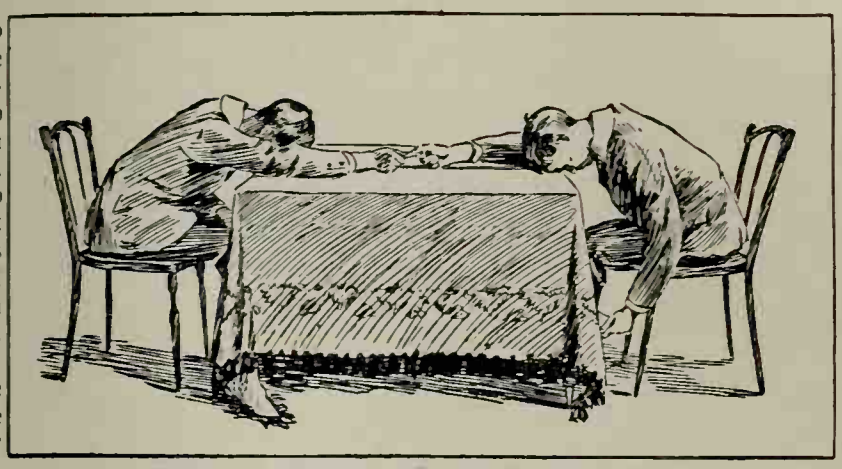
cating powers of a hektograph, the profits will easily purchase a second-hand mimeograph. The price for such a machine will not be great, and there is no limit to its duplicating power if it is skilfully handled.

Additional helpers may, as need arises, be drafted into the scheme, but the editors must take care to enlist only enthusiasts. Apart from the pleasure which the "power of the Press" gives, our founders will find their newspaper experiences will unconsciously afford them an elementary business training which will be of value to them in after life. The photograph on page 4820 shows schoolboys engaged in printing a monthly issue of three hundred and fifty copies. In this case the illustrations are colored by hand, and the business side includes such officials as time-keepers, storekeepers, clerks, and so on.

Such an organisation is, of course, a matter of time, and we may be sure that our paper, if started in the right way and with the necessary enthusiasm, will grow into quite a prosperous and up-to-date journal.

THE WIZARD OF WABASHA

THE trick known as the Wizard of Wabasha is of the mind-reading or thought-reading variety. If cleverly done it is really wonderful and very puzzling. You tell the audience that even their thoughts are not hidden from you, and you invite one of them—the most incredulous for preference—to come forward and let you prove that it is so. You give him a piece of paper and ask him to write upon it any three questions he likes, and after he has done this you request him to double the paper lengthwise, then to fold it again lengthwise, and then to double it across its length. It will then be a small folded slip. You ask him to hold one end of the folded slip firmly between his forefinger and thumb and you take hold of the other end firmly between your forefinger and thumb. You lead your friend to a table and ask him to sit down on one side of it while you sit down on the opposite side. You have both been holding the folded paper firmly—one each end of it. Upon the table you have already placed a ribbon or leather belt or even a piece of string. Any one of these things will do, as they serve no real purpose, but only make an excuse for you to get your companion to do what follows. You explain to him and to the audience that you have the marvelous power of reading his thoughts when you both put your foreheads on the table right on the ribbon or belt or string. Then, if he will think intently upon the questions, you will find out what these questions are, and you will answer them.



The Wizard of Wabasha answering the hidden questions.

When both of you have placed your heads upon the communicating band, you assume the appearance of deep thought, and if possible of mental anguish, and finally tell him one by one what his questions are and invent some answers for them. Then, when you have answered his three questions, you release the paper and ask him to open it and show it to the audience as proof that you read correctly the questions he had written.

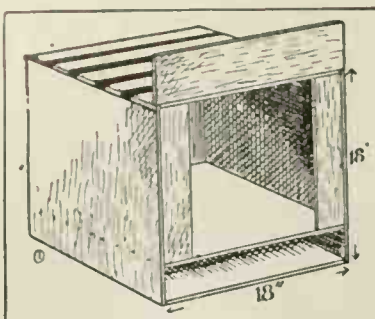
Now for the explanation of how the trick is done. You have two pieces of paper, one folded exactly as you are going to tell him to fold his, and the other unfolded. You give him the unfolded one, and when he has written it and folded it exactly as instructed you take hold of one end of it. But, hidden away in the palm of the hand that holds his paper, you have the other paper folded in exactly the same way. As you lead him to the table you contrive to make him lose hold of the paper for a second, and when he grasps it again you put between his finger and thumb, not the same piece of paper, but the other or blank piece. Upon this movement depends the successs of the trick. Boldness and a ready flow of talk will help you very much by diverting attention, and no one, least of all the writer of the questions, will imagine that the paper now held is not the one containing the questions.

Having succeeded thus far, it is not difficult to put your other hand—your left one—up to your right, and, unseen by the audience, to take the paper with the questions. Then you sit down at the table, and as you have arranged that both of you place your foreheads on the table in order that the thought-reading may be successful, you have the opportunity to read the questions on his paper, which you open with your left hand. The picture shows a young conjurer at this stage of the trick.

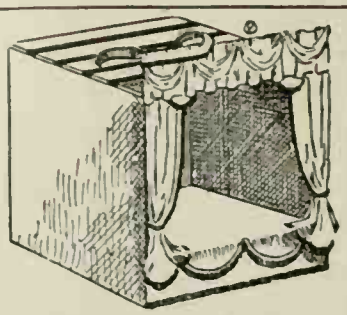
After you have read the questions, you have to replace the right paper again. This is rather more difficult than the former exchange was, because you have not the movement of walking to the table and sitting down to cover your actions. Still, you can manage it. As his forehead is on the table, he cannot see your left hand move up to your right to place the paper in it, and as your left hand is the one farthest from the audience, your right arm will help to conceal the movement. To replace the paper you should not wait until you have answered his questions, but should do it as soon as possible after you have read them.

BUILDING A MODEL STAGE

TO most of us the theatre is a perfect fairy-land, peopled by all sorts of wonderful beings in all sorts of marvelously colored dresses. They are like people who have walked out of dreamland for a little while to amuse us poor folk on earth. There is no reason why we should not all have a theatre of our own that we can play with at home. All we need do is to make a toy stage with toy scenery and toy actors and actresses. The more brilliant among us may even write short plays, and entertain our friends by giving performances upon the stage that we have made with our own hands. We shall now proceed to show how to make our stage and little men and women.



1. The stage undraped.



2. How to drape the stage.

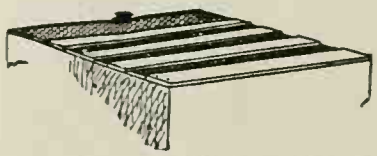
The frame of our little stage will be made from a rough box. The front opening may be of any convenient size, depending on the size of the box at our disposal. It should be not less than eighteen inches wide, however, and eighteen inches is a good height. The stage is raised from the ground two inches. The top is made of strips of wood stretching from side to side, with a space of one inch between the strips. It is through the openings between the wooden strips that we let the scenery and also our actors and actresses descend upon the stage when the right time comes.

Now we nail to the top of our stage a front board, as seen in picture 3. It may be four to six inches high, and it must go from side to side. Its purpose is to hide the movements of our hands as we manipulate, or work, the scenery and the figures.

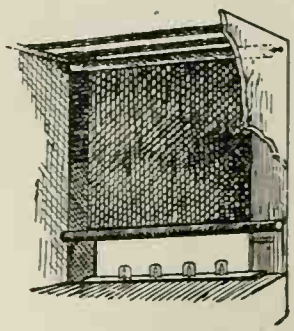
Our next task is to make the footlights, which are essential to any stage. The footlights must not be seen by the audience sitting in front of the stage, so they must throw out no light towards the front. Their light should be thrown entirely upon the stage, the scenery, and the actors and actresses.

The simplest footlights are candles. They must not be very long, and as we want them to last some time we should select short pieces of good, thick candles. If we get a few carriage candles and cut them into sections about two inches long, they will do very well. We make our candle reflectors from pieces of tin, about four inches square, bending each piece into a curved shape, as in picture 8. To fasten the pieces of tin to the floor in the front of the stage, we can make a few holes in the tin by driving a nail through them, and then tie the tin pieces to tacks or nails driven into the wood. We place a candle behind each tin reflector. We can stick the candles on to the wood by allowing a few drops of candle-grease to drip from a lighted candle, and then put the candle in place while the drops of wax are still hot and liquid. If we wish to make them still more secure, we can put in three wire nails about one inch long with the points sticking up a bit. The candles will fit between the nails seen in picture 8. The reflectors and the candles behind them may be placed four inches apart from each other. The sides of the reflectors which are next to the audience may be painted the same color as the stage hangings that we are now about to consider, or they may be covered with colored paper so as not to allow the tin to be seen by the audience.

3. Shape of the front board.



4. The roof of our model stage.



5. The drop curtain partly raised.

6. Row of footlights.

7. Curtain roller.

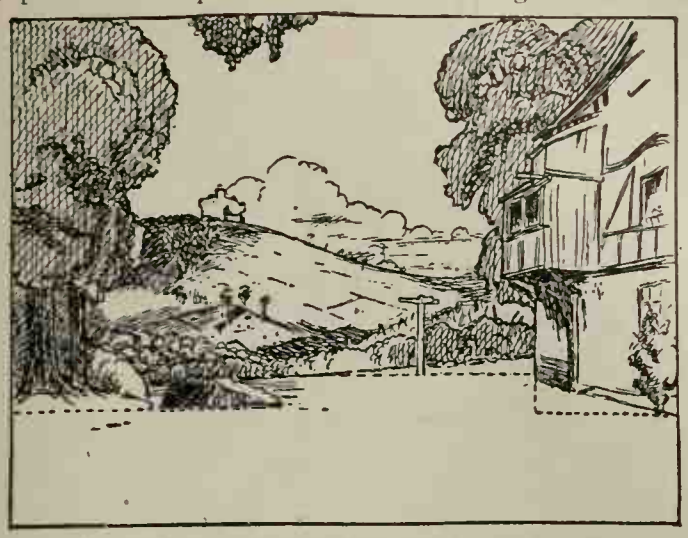
8. Tin reflector.

To drape our stage in front, as seen in picture 2, we may use any cheap fabric that gives a good effect, and we can usually find about the house some remnant that will serve our purpose. If we have to purchase the cloth, a yard of sateen, or other similar cloth, will provide all we need. Any nice color, such as blue, green, crimson, or old gold, will do. We attach the hangings with tacks, taking care to let the top hanging fall down below the roof for one or two inches, and to make the sides full, so that there will be no opening between the sides of the stage and the sides of the drapery.

A drop curtain is not absolutely necessary, but every proper stage has one; so if we wish to be quite up to date we shall make one for our stage. To make it we require a piece of cloth, the color of which may be the same as the cloth used for

the drapery that we have already put up. The size of this curtain will be three inches less than the size of the stage from side to side, and in the other direction it will be the same size as the height of the stage from the floor to the top.

To hang this curtain, the best method is to have two thin wooden rollers half an inch shorter than the exact width of the stage inside. We fix the top of the drop curtain to one of the rollers by tacking the edge to it, and we attach the bottom of the curtain to the other roller in the same way. Now we make two holes in the side of the box just opposite where the centre of the upper roller is to be, and we drive two wire nails through these holes into the centre of the top roller at each end, as shown in picture 7 on page 4822. The nails should be thin, so that they may easily turn round in the holes in the stage wall. We next fix a cord to the end of the top roller and wind it round and round like a window-blind cord, taking care to keep it as far away from the stage wall as possible. The curtain from the inside of the stage will look like picture 5, which helps to explain how to make and fix it. By pulling the end of the cord the curtain rises, and by unfastening the end of the cord the curtain falls. The free end can be looped and put over a tack driven into the side of the stage at the back, thus keeping the curtain up when it is necessary to do so.

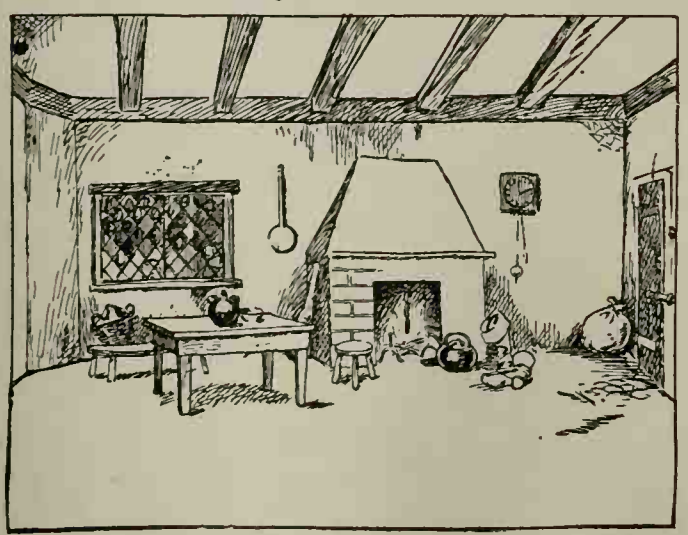


9. A typical piece of woodland scenery for the stage.

Now we shall make a back scene, or more than one if we wish. The easiest way is to have a sheet of cardboard and to draw and paint on it a picture, making the colors strong, as it is to be viewed from a distance and under artificial light. This cardboard scene should be the size of the back of the stage. We may have a different scene on each side of the cardboard, so that by reversing it we can change the scene. It is possible to make back scenes on hanging cloth, or canvas hung on rollers just as the drop curtain was hung. This way is very much better, but it involves a little more trouble to give it the proper effect.

We should make a variety of side scenery, such as trees, pieces of landscape, parts of houses, and many other ornamental things and there is plenty of room and scope in making these for the exercise of both artistic skill and of ingenuity. These side scenes should be drawn and painted on cardboard just a little taller than the stage, and they must be put into position through the cross-pieces at the top of the stage, where they rest without moving until we wish to change the scene by withdrawing them. These side scenes, after having been drawn and painted on cardboard, should be cut out so that our audience can see beyond them. If they are made of good, thick cardboard, they may be stiff enough, but if of thin cardboard it may be necessary to glue thin slips of wood or stiff cardboard to the back, so that they can be made comparatively rigid. Pictures 9 and 10 on this page show pieces of typical scenery which may be copied, making them of a size suitable for our stage. Set pieces are also desirable.

We have now only our actors and actresses to make. We can draw them on cardboard, but an effective and perhaps a lazy way is to take scrap pictures, stiffening them by pasting them on cardboard if necessary. Then we hang them on wires, which must be long enough to reach from the roof. Flower wire will do, or the wires from soda-water bottles. The wires can be bent round at the top end so that they can hang over the strip of wood forming the roof. We can make actors and actresses from clothes-pins as shown on page 4495.



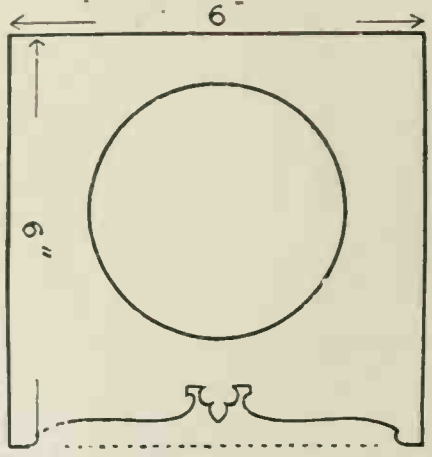
10. This scene shows the interior of a country cottage.

We are now ready to give our theatrical performance. We put our scenery in position and hang our figures on the wooden strips over the stage at the far sides, where, by manipulating the top ends of the wires, we can make them walk on to the stage as we require their presence. The words of the play can be recited by the player, and he must take care to change the tones of his voice to suit the style of character he is trying to imitate. It is essential that, before making a public performance, we should have several rehearsals, so that the play will be sure to proceed without a hitch of any kind. We should always remember the old saying that when a thing is worth doing it is worth doing well.

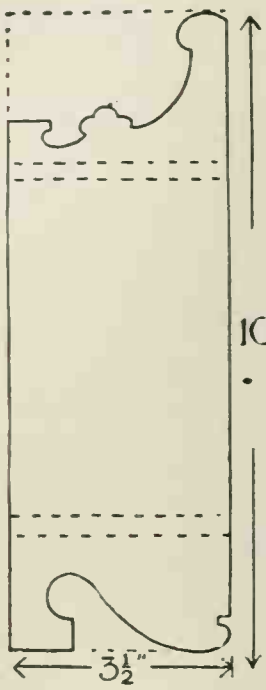
AN OAK CASE FOR A CLOCK

THERE is a variety of clock, with a nickel-plated metal case, that is very cheap, about one dollar being sufficient to purchase one that keeps good time. It is possible, with very little trouble and expense, to make for such a clock an ornamental oak case that will transform it into quite a handsome piece of furniture.

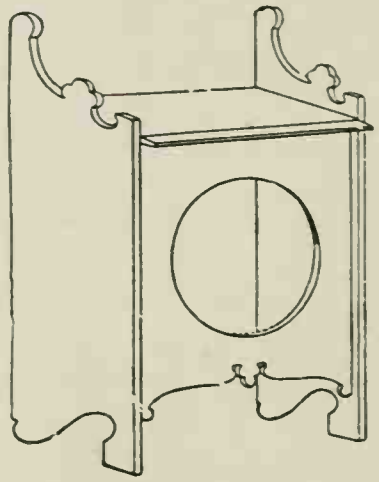
We need some pieces of seasoned oak about half an inch thick, but we may remember that any other wood will do as well. We have chosen oak only because it happens to be a wood that looks well without a great deal of polishing, and because it is inexpensive. We shall, first of all, make the front of our clock-case. It requires a piece of wood six inches square. With a pair of compasses we draw upon one side of the wood a circle of the same size as the dial of the clock, and then we cut out the circle as seen in picture 1. The best way to cut this circle out is by using a fret-saw. If we do not happen to have a fret-saw, we can purchase one for twenty-five cents, and we shall find this little tool very useful indeed for the task we have undertaken. In using the fret-saw we should be careful to cut straight and not saw crookedly. Then, still carefully using our fret-saw, we give to the front piece the form of ornamentation at the bottom that we see in picture 1.

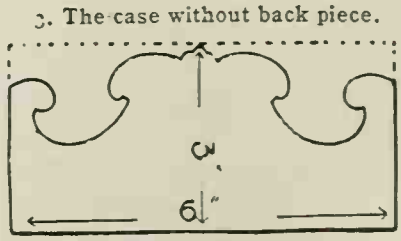


1. The front of our clock-case.



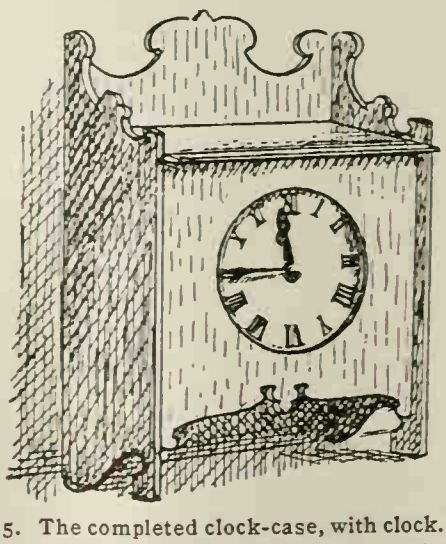
2. Shape of the sides.


3. The case without back piece.



4. Design for the back piece.

Now we shall commence to make the two sides, cutting them out with the fret-saw from pieces of wood measuring ten inches long by three and a half inches wide. Both sides must be exactly alike. The design is seen in picture 2. Before gluing and nailing the front and the sides together, we must make the top from a piece of wood six inches long and four inches wide, and put a plain bevel in front. This goes below the ornamental part at the top of the side pieces, resting on the top of the front piece, and projecting about half an inch in front, as seen in picture 3. We have yet to make the back piece for the top, the pattern of which should be suitable for the fret-saw, and also in harmony with the design of the sides. This piece is seen in picture 4. We must draw the design carefully upon the wood, and then cut it out, taking great care that from the middle to one end is exactly the reverse of the pattern from the middle to the other end. When we have put on the back top piece, as seen in picture 5, we have nearly finished the part of the clock-case that will be exposed to view when it is in position on the mantelpiece. But we have still a bottom piece to make, and finally a door for the back. These need not be of oak or the wood that we have used for the pieces already made; so if we have any odd pieces of wood that will suit, we may as well use them. We must fit the clock in its case, and that will enable us to see exactly where the bottom should be. The bottom will be made just wide enough to come even with the side pieces at the back, and will be about three inches wide. Then we make and fix on a door at the back with a pair of small hinges, taking our size from the opening. Our clock-case is now quite finished.


5. The completed clock-case, with clock.

It is much better for all the joints to be carefully glued in addition to being nailed; and we should have the glue quite thin, as this is always easier to manipulate and also holds much better than thick glue. If the wood used for the clock-case has been mahogany or walnut instead of oak, we may like to French polish it in the manner described on page 2873. We may, however, if we prefer, enamel the clock-case instead of polishing it, especially if it is made of a light wood, when it will be found very suitable for a bedroom.

THINGS TO MAKE WITH FOLDED PAPER

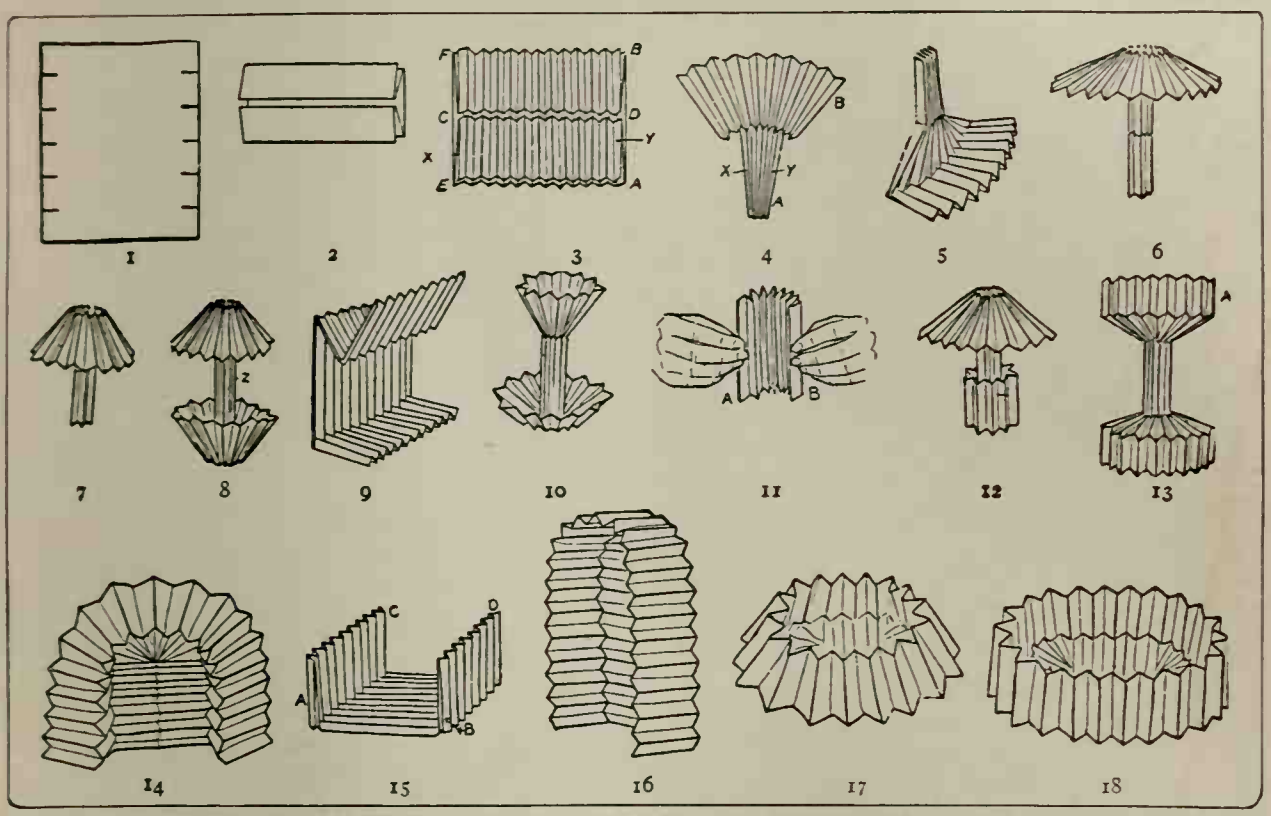
A VERY great deal of amusement and enjoyment can be obtained from a plain sheet of paper measuring, say, 30 inches by 24 inches, or a smaller piece of somewhat similar proportions. No other apparatus is needed; and yet, by simply folding the paper and then opening it out in different ways, about a hundred different things can be formed. With a little practice we shall get skilful in folding and unfolding the paper; and we can then give quite an interesting entertainment to our friends, causing them a great deal of astonishment and delight. Or, if we are a guest at an evening party, we can "make things go" with the same simple apparatus.

It is advisable to take a large sheet of paper of the size metioned, 30 by 24 inches, as the folding is not then so tedious, and it is simpler to manœuvre the paper when folded. But if such a sheet is not available, then the experiments can be carried out with a sheet of notepaper cut to the right proportions or thereabouts. Having obtained our sheet of paper, let us mark off on each side six equal parts, as shown in figure 1, and fold the paper as shown in figure 2. Now, by making small neat folds backwards and forwards alternately in this sheet of paper, which is already folded into three thicknesses, we have it like figure 3 and are now ready to make a great assortment of objects.

By nipping together the end of the folds at A, as in figure 4, and spreading out the top, B, we get a fan. The next figure, 5, is obtained by inserting the finger at the point C of figure 3 and moving it along under the folds to D. This pulls out a row of fluted folds; and by holding at A as for the fan, but inverting the paper, we get a bracket.

Now hold the same way up as for the fan, and, keeping the upper folds that formed the shelf of the bracket spread out horizontally, bend round the small folds marked X and Y in figures 3 and 4 until they meet at the back. We shall then have an umbrella as in figure 6. By moving the shade part of the umbrella to a sharper angle, we have the toadstool in figure 7.

Draw out the lower row of fluted folds like those that form the top of the toadstool, and twisting the folds of the stem, Z, round as for the toadstool, we get figure 8. Now pull out another row of folds at the top, as in figure 9, draw the centre folds together again, and we have figure 10 in its place.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

SOME OF THE MANY THINGS THAT CAN BE MADE BY FOLDING A PIECE OF PAPER

1. The paper marked for folding. 2. The first folds. 3. The paper folded. 4. Fan. 5. Bracket. 6. Umbrella. 7. Toadstool. 8. Candlestick. 9. How the folds are pulled out. 10. Vase. 11. How the stems are formed. 12. Lamp. 13. Dumb-bell. 14. Porch. 15. Newspaper-rack. 16. Sentry-box. 17. Jelly-mould. 18. Bowl.

If there is any difficulty in forming the stems and stalks and getting the distended folds to form into round shades and cups and so on, figure 11 will make it clear how this is done. A and B are the end folds on each side of the concertina-like sheet of paper, and these are drawn round at the back till they meet. This has the effect of twisting all the folds round, so as to form a shade for an umbrella, the top of a toadstool, and so on.

Figure 12 shows a lamp; it is a slight variation of figure 10. By drawing out the bottom folds the same as those at the top in figure 8, and then twisting the stem round as before, we get figure 13. Now, keeping the paper in this form, take the ends of the folds A and

B between the fingers and draw them together. This will give figure 14—a kind of porch. Place the paper as in figure 15, and we have a newspaper-rack. Draw A and B together, and we have a sentry-box—figure 16. By drawing together not only A and B in figure 13 but also C and D, we have a jelly-mould as in figure 17; and without changing anything, but simply moving our hands farther apart while we hold the jelly-mould, we get a bowl or vegetable-dish as in figure 18.

These are only a few of the many shapes and figures and models that we can make from a plain sheet of paper. Once we have the paper folded as in figure 3, we can keep inventing our own designs; and when we have become expert and skilful in the use of a paper folded into the sections shown here, we can still further elaborate the folds, and get even more astonishing models.

A number of points should be carefully borne in mind. In making the backward and forward folds to prepare our sheet of paper, it is essential to make small and neat folds. If we make wide and clumsy folds, the paper will not have the elasticity that will lend itself to a great variety of shapes and twistings. It is therefore well worth while to take considerable pains to get our paper nicely folded in the first place. Another point to remember is, if we wish to be successful as an entertainer with the magic folding paper, we must, after making one figure or series of figures, close up the paper and press the folds well together again, so as to keep them well marked, and thus enable the paper to keep its corrugated appearance. Following these precautions we can make staircases, window-blinds, boxes, vases, hats, mats, Chinese lanterns, and, in fact, there are few objects that cannot be represented by folded paper twisted or turned in a certain way.

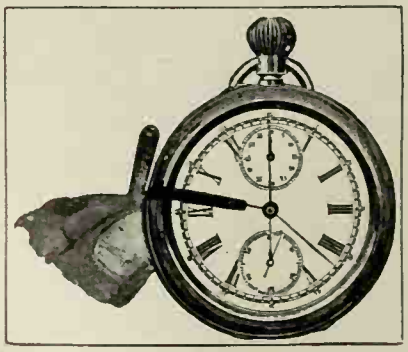
It is certainly wise, in the first place, to get paper for our purpose that is tough and will not easily wear out at the folds. If we get a common paper, the folds soon wear into holes, and we are under the necessity of going to the trouble of folding another sheet. At the same time, it must be borne in mind that a paper must not be selected so tough that it will not fold neatly and closely, or our efforts to make graceful objects will end in failure.

Before attempting to give a display to our friends, it is, of course, essential that we should have a good deal of practice in quickly manœuvring the paper. The effectiveness of such a display depends upon the speed and neatness with which we perform.

HOW TO USE A WATCH AS A COMPASS

IT very often happens that we should like to know in which direction the north or south lies, yet, as very few people carry even the simplest form of mariner's compass with them, we are generally content to make a more or less inaccurate guess at it. But most people carry a watch, and if this shows the correct time, and the sun is shining, it becomes quite a simple matter to find the south, and, from that, any other direction.

This is how it is done. Hold the watch horizontally, face upwards. Then place some slender article, such as a match or the stalk of a flower, upright against the edge of the watch, and at the point on the rim of the glass opposite the point of the hour hand. By turning about, it is easy to get the watch into such a position that the shadow of the match falls along the hour hand, as seen in the picture. This means that the hour hand is pointing at that spot in the horizon which comes immediately under the sun. The south is exactly midway between that point and the figure XII on the dial. Thus, if it is eight o'clock in the morning when we try the experiment, we know that, when we have got the watch in the position necessary for the shadow of an upright match to fall along the hour hand from its point, a line drawn from the middle of the dial through the figure X will point to the south. If it is ten o'clock when we make the experiment, then the south will be indicated by a line drawn from the centre of the dial through the figure XI. If it is afternoon the same rule applies, only in that case the point to indicate the south will be backwards in time, not forwards. If it is two o'clock the line to indicate south will pass through the I, and if it is four o'clock the line will pass through the II.



How we may find the points of the compass by using an ordinary watch.

To understand this, we must remember, first, that the sun is exactly in the south every day at noon, so that it takes 24 hours to complete its apparent journey round the earth; second, that the hour hand of a watch takes 12 hours to go completely round the dial, and therefore moves twice as fast as the sun. Now, if at noon we place the watch in the position described, with the hour hand pointing to the sun, evidently the figure XII will be pointing south. Therefore, at any other time, say, four o'clock in the afternoon, we know that the hour hand of the watch has gone twice as far past XII as the sun has gone past the south; so that, as we still have the hour hand pointing at the sun, we must go half-way back to XII to get the south, which of course means that the figure II points south. In the same way, if the time was eight o'clock in the morning, the hour hand will go twice as far before noon as the sun goes before it reaches south, and therefore half-way *forwards* to XII—that is, the figure X points south.

For the sake of simplicity, we have spoken only of exact hours, four o'clock and eight o'clock, but any other time would be equally easy, since it is the hour hand only which we use, and half-way, in one direction or the other, from the hour hand to XII is the south.

HOW TO MAKE A COLLECTION OF SHELLS

IT would be well to begin with the land-snails. Some are as large as horse-chestnuts, others so small they are like pin-heads. They differ, too, in color and in shape. The surface may be smooth, or furrowed with lines, or rough, with short, stiff hairs. The opening of the shell, out of which the feeding snail thrusts its head, is called the lip, and is sometimes curiously bent and wrinkled; on the inside there often appear little ivory-like knobs called teeth.

WHERE TO FIND WATER SHELLS

The best place to look for shells is the seashore, and on any beach or coast we shall be sure to find something of interest and value for our museum. Some will, of course, be broken, through having been thrown upon the stones by the waves; but many may be found embedded in the tangled seaweed. As there are very many tiny shells, a pocket lens, which will prove of great assistance, should be taken on our shell-hunting expeditions. We may also obtain many interesting specimens of shells from the fishermen on our coasts.

For fresh-water shells, the river, the stream, the pond, and the ditch should be searched, and a warm, sunny day with little wind is the best time. Some kind of a dredge is necessary, and a handy one may be made of perforated zinc in a similar shape to that of a coal-scoop, only smaller. If the water is clear, we may be able to see shells lying in the shallow water; but if we are unable to see, we should use our dredge, drawing it first through the surface water and afterwards through the mud or gravel at the bottom.

HOW TO LOOK FOR LAND SHELLS

If we cannot get to the seaside, or even reach a river or stream, we can find land shells, even in our gardens; and if it be only the shell of the garden snail that is available, it is astonishing what an interesting collection can be made of different varieties. The evening of a rainy day is the best time to search for land shells, and, although they may be found all the year round, the months from April to December are the best. The hedgerow, the mossy bank, among the roots of trees, under stones and logs of wood, under leaves and heaps of rubbish, these are some of the places in which to look for land shells. The creatures that live in the shells come out to feed at dusk, so that the best time to begin our search is in the evening.

TO CLEAN THE SHELLS

If the shell is inhabited, we must first of all remove its occupant, and then the shell should be soaked in hot water. This will dissolve any salt that may adhere to sea-shells, and will loosen the dust on all shells. Having thus thoroughly cleansed our specimens and dried them, we shall find it a good plan to paint them over with a thin solution of gum arabic, to give them the lustre and glistening appearance that they have in water. Ordinary white of egg may also be used for the purpose.

HOW TO ARRANGE THE SHELLS

If we can get little white cardboard boxes, such as jewelers use for putting rings and chains in, they will be the most suitable for storing our shells. We are fortunate indeed if we can find a few candy boxes, especially those made with two or three layers, for these would be splendid for the purpose. If we feel ambitious to start a larger collection of shells, we may use a shallow wooden packing box divided into compartments. The shells look very nice arranged in their boxes in cotton-wool or wadding, which may be purchased at the store for ten cents. We should use white wool for the dark shells and blue or red wool for light shells. Some collectors stick their shells down on colored cards, but it is better not to stick the shells down. A little label should be stuck on each box with the name of the specimen, and the place and date of finding. These labels may be pieces of ordinary stamp-edging. Of course, for sea-shells, such as those of oysters, scallops, and mussels. larger cases are required.

THE SHELLS TO SEARCH FOR

The first of the land shells is that of the snail, there being forty different kinds, and in many cases the shells of each kind vary greatly. Of the ordinary snails, the most easily found are the common snail, with olive shell and dark-brown bands; the girdled snail, with its yellowish-green shell, not to be confounded with the rarer and prettier green snail; the garden snail, which varies greatly in its colors; the shrub snail, resembling the garden snail; the gored snail, found in chalk and lime districts; and the black-tipped snail, that is so much like the gored snail as to be often mistaken for it; the pale-green heath snail, and the greyish bristly snail, which may be found on dry heaths.

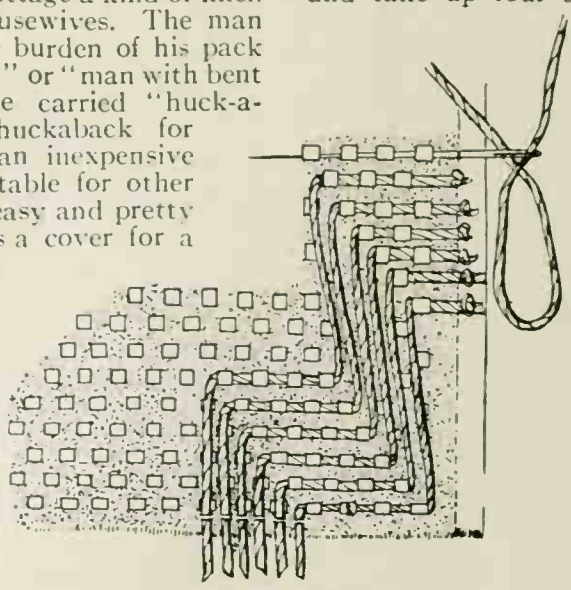
In addition to these common snails, we should look for the transparent glossy snail, that can be found under decaying leaves and in damp moss. The shell is very thin and glossy, and is a transparent green. Then there is the smooth yellowish shell of the cellar snail, found in cellars and drains and among the long grass of fields; the flat, yellow, and polished shell of the garlic snail, so called from the odor of garlic which it has when alive; the dull snail, with the small yellowish-brown-colored shell; the delicate snail, another kind with a tiny shell, smooth and very glossy; the amber-colored shell of the rayed snail, small and wrinkled; the little excavated snail generally found under fallen trees; the small shining snail which does so much damage in hothouses.

Other shells we shall find in large numbers on land, and in the ponds and rivers and ditches, and it is an interesting occupation to identify these by grouping them after the style of the specimens in the local museum, or, if there is not one near, by searching through the pictures in shell books that can without doubt be obtained from the local library. Sea-shells gathered on the holidays may also be identified and grouped in the same way.

A HUCKABACK TABLE COVER

HUCKABACK! This sounds like a very peculiar word; yet it deserves respect because of its great age, and because it has history wrapped up in it. Centuries ago, long before there were stores within easy reach, hawkers, or "hucksters," used to tramp through England, Germany, and the Netherlands, to sell in castle or cottage a kind of linen cloth much prized by housewives. The man with back bent under the burden of his pack they called "the huckster," or "man with bent back," and the linen he carried "huck-a-back." We still use huckaback for toweling, but it is now an inexpensive and durable material suitable for other purposes. Worked in an easy and pretty fancy stitch, it is useful as a cover for a table or stand and is also attractive as a pillow-cover.

If we ask for it at the store, we shall find there are several kinds, one white and rather thin, measuring twenty-three inches in width and costing about fourteen cents a yard, and a thicker, rather cream-colored material, also twenty-three inches wide and costing about eighteen or twenty cents a yard. Both have a little white square spot. It is this little white spot which makes it possible to use huckaback as a foundation for fancy-work, as we shall see.

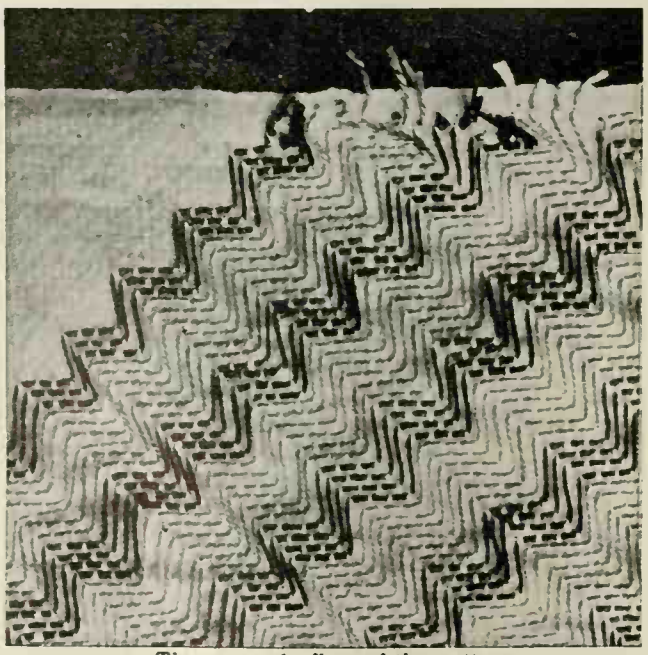


1. How to begin the pattern.

Suppose we have a table for which we should like to make a pretty washable cover. We measure it to see what quantity of huckaback we shall need, allowing for a hem round the edge. That shown in picture 2 is a rather coarse cream-colored variety. At the same time we buy some balls of silkoline, five at about eight cents each, shading from light to dark either in blue, pink, yellow, or green, as fancy may dictate, to suit the general coloring of the room.

If we look at picture 2, we shall see that there are two rows for each of the five shades—ten rows altogether to form a series. We might use fewer colors; then the pattern would be smaller; or still more, when we should get the effect of wider bands.

The method of obtaining the up-and-down pattern is very simple. We thread a wool needle—choosing this for its large eye and blunt point—with a needleful of the darkest color, and make a knot at the end of the thread. We start with this through the selvedge at the ninth row of white squares up from the bottom right corner of the cloth, and take one stitch to the left, as shown in picture 1. Then, omitting the three squares below, we pass the needle under the fourth and take up four squares on the needle, as though we were darning. If we have forgotten how to darn, we should look at page 3555. The thread is then stitched through and cut off about one inch from the end. Keeping the same colored thread, we start the next row with the square in the second row from the selvedge, and proceed to follow the course of the first thread along the squares beside it. If we remember always when we have once passed the irregularity of the first corner that we take up four squares on the needle, then miss the three squares below and start with the fourth, we shall find the pretty wavy pattern shown in picture 2 growing under our fingers. This illustrates the general effect of the work on a small portion of the cloth, not at a corner. Thus we see the work is simplicity itself, and can be done very rapidly. When all the surface of the huckaback is covered with the thread, the edges with the loose ends are neatly turned over and hemmed in on the wrong side. A fringe or lace edging of the same color as one of the balls of silkoline makes a dainty finish to the table-cover; or, as silkoline is much used for crocheting, we may like to crochet an edging with it. A pattern with a pretty point would be most suitable. If we have learned how to make gimp with a hairpin fork, as described on page 4496, we may like to use that for an edging.



2. The general effect of the pattern.

It is possible by working very short rows, say, two or three waves wide only, that is, with less colors, to make a border and leave the greater part of the huckaback uncovered. Again, with a little ingenuity, we can easily contrive many kinds of patterns—squares, diamonds, stars—and even outline figures

and landscapes. But if anything of this kind is attempted, the huckaback should have a very clear and prominent pattern, otherwise the counting of the squares will prove most tedious work and will be very trying to the eyes. In fact, all work of this kind should be done on coarse material.

There are other uses for huckaback worked in the way here described. It can suitably be made up into handkerchief-sachets, shoe-bags, nightdress-cases, comb-bags, sideboard-cloths, and covers for tables, and one of the greatest advantages for all articles in daily use is that huckaback washes perfectly and wears very well, and in addition to this is quite inexpensive.

THE ANSWERS TO THE PUZZLE PICTURE-NAMES

ON page 4810 is a series of puzzle picture-names of famous people of whom we read in the BOOK OF MEN AND WOMEN. The following are the correct names and the pages on which we can read something about them: (1) Tarquin, page 435; (2) Drake, page 862; (3) Selkirk, page 364; (4) Baker, page 302; (5) Agrippina, page 538; (6) Emmanuel, page 65; (7) Dampier, page 364; (8) Blaxland, page 364; (9) Columbus, page 62; (10) Romulus, page 435; (11) Antony, page 535; (12) Shakespeare, page 5579.

SOME EXERCISES TO PRACTISE AT HOME

PERHAPS some of us are quite tired of hearing the words "Don't stoop," and most likely when we do hear them we only straighten up for a few minutes, and then the head sinks, the shoulders come forward, and the back rounds as badly as ever again. It may be necessary, if we are really too fatigued to hold ourselves up, to lie down flat for a short time in order to rest our muscles; but it is our regular daily exercises that will be most helpful toward strengthening the muscles and curing the stooping, *if we make up our minds that they shall.*

So let us set to work again, and take our exercises before a mirror if we can, to make sure that we are carrying out the directions given, and are correctly copying the pictures that illustrate them.

I. BREATHING

Handkerchief drill. Attention. (1) Place first finger of left hand on left nostril, so as to close it; (2) breathe in deeply through right nostril; (3) release left nostril and close the right with right forefinger, and breathe out slowly through left nostril; (4) do the exercise again, this time breathing in through the left nostril, and out through the right. Repeat three or four times alternately.

II. ARM EXERCISES

Attention. (1) Arms upward bend; (2) arms forward stretch, the arms and hands the width of the shoulders apart, palms facing, fingers and thumbs straight, arms straight and level with the shoulders, body upright; (3) return to arms upward bend, always keeping the shoulders back; (4) repeat several times, being careful to stretch out as far as possible, and to return smartly to perfectly correct position; (5) from arms upward bend, proceed to arms stretching downward, with vigour, palms turned to sides, fingers straight, shoulders well back; (6) return, with a will, to arms upward bend; (7) add these two exercises to those already learnt, and proceed thus—from arms upward bend, arms forward stretch, return; upward stretch, return; sideways stretch, return; downward stretch, return. Repeat this exercise several times, and see that you stretch well and return smartly. The exercise can be slightly varied by doing each movement three or four times before passing on to the next.

III. FEET EXERCISES

Attention. Feet full open, hips firm. (1) Feet placing outward; place the left foot about two foot-lengths in the direction in which the toe points when standing at full open, bending the knee of left leg slightly, and keeping the right straight, dividing the weight of the body equally between the two legs; let the toe touch the ground first; head well up, chin in; (2) return to full open position, taking care not to drag the returning foot; (3) repeat movement, this time with right foot; (4) add this exercise to those already learnt, thus—feet placing sideways, return; forward, return; outward, return; repeating several times.

IV. TRUNK EXERCISES

Be particularly careful to breathe gently and quite naturally all the time that you are doing these exercises; never hold the breath. Trunk bending backward, feet astride, hips firm. (1) Raise the chest and bend the upper part of the spine slightly backward, the head being carried back with the body; keep the knees straight, and do not bend the body from the waist; (2) return to first position by trunk upward stretch; (3) repeat several times, bending a little farther back as the exercise becomes easier, but always from the top part of the spine; (4) add this exercise to those already learnt, and proceed thus—trunk bending backward, return; forward, return; trunk turning left, return; right, return. Repeat several times.

V. BREATHING

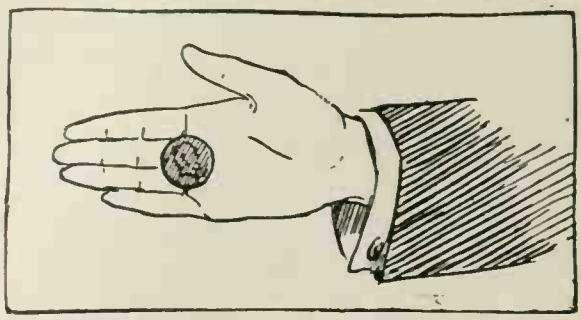
(1) Start with the arms by the side, palms inward (2) breathe in, as the arms are turned backward, pressing the shoulders back till the palms are outward; (3) breathe out as the arms are turned back again to the first position.

THE MYSTERIOUS DISAPPEARING PENNY

THIS is a penny through which a tiny hole, not larger than the thickness of a pin, has been bored, close to the edge.

Having obtained a penny so treated, the young conjurer must next procure a long hair. A piece of fine pink or flesh-colored silk thread will answer the same purpose, and, in fact, is in some respects more manageable. A few inches of the hair, or silk, as the case may be, are to be passed through the hole in the coin, and the ends tied together so as to form a loop. This loop must be of such a size that, when it is passed over the fore-finger as far as it will go, the coin shall hang down over the lowest joint of the middle finger as shown in the picture.

The coin being thus made ready for use, the young wizard must practise making it disappear and reappear; or, in other words, transferring it to the back of the hand, where it will naturally be invisible, and bringing it again to the front. The disappearance may be effected in either of two ways. The first is by means of a quick backward turn of the wrist, the coin swinging over to the rear by its own weight. The second is to tip it back with the tip of the thumb. Both methods should be well practised, and it will be found a good plan to practise them before a looking-glass, as we can then judge of the exact effect produced. The tilting movement should, in either case, be covered by a slight sweep of the arm backwards, to cover the disappearance of the coin, forwards for its reappearance.



How the magic penny should hang.

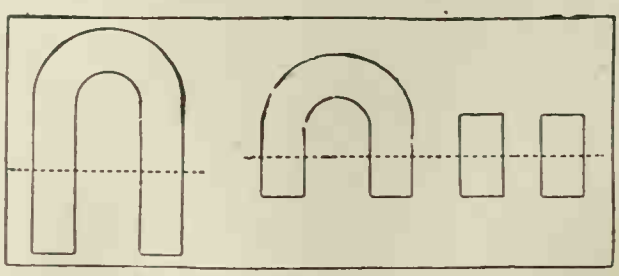
The effect will be magical, if professedly executed with a coin just borrowed, as to which there can be no idea of preparation. But a clever conjurer is not content with merely causing the disappearance of anything. To make the trick complete, he makes the vanished object appear somewhere else. As a simple example of this, we will suppose that, having the prepared coin, suspended by its loop, concealed in the right hand, the performer borrows a penny, which he takes in the left hand, letting it lie on the joints of the second and third fingers. Making a half-turn of the body from left to right, he apparently places it in the right hand, in reality retaining it in the left by slightly bending the two fingers above named, and showing in the right hand the trick coin, as if that were the one just lent to him. The other hand is drawn away, palm downwards, as if empty.

Showing the trick coin as above, lying flat on the hand, the performer asks someone to spread a handkerchief over it. "Go!" he says. He lifts the handkerchief delicately by the centre, but the coin has disappeared, having been tipped over by the thumb to the back. Again he has the palm covered and brings the coin, by tilting the hand as he removes the handkerchief, mysteriously back again. At this point there will probably be a cry of "Up his sleeve," the sleeve having from time immemorial had the credit of half a conjurer's uncanny deeds. To disprove the false accusation, he pulls up the sleeve, and with the arm bare "vanishes" the coin once more, but at the moment of saying "Go!" thrusts forward the closed fist of the left hand, and opens it with a jerk, showing the borrowed coin therein.

He may now pick up the borrowed coin from the left hand, again showing instead in the right the trick coin, which he has meanwhile swung once more to the front. He then says: "I shall now order the penny to pass into that matchbox," where he has concealed a similar coin beforehand. The right hand is again shown empty, and while the astonished company turn to see whether the coin has really passed to the place indicated, the real borrowed penny is quietly dropped into one of the pockets of the conjurer.

SOLUTION OF THE CARD PROBLEM ON PAGE 4707

THE boys and girls had been greatly puzzled for a long time by the problem that their uncle had set them, but when he showed how the horse-shoe card could be divided into no fewer than seven pieces by making only two cuts, it seemed very simple indeed. The card was not to be folded in any way. Holding the card at the bend in one hand, the uncle took the scissors in the other and made one cut across the two arms of the card. This, of course, divided the card into three pieces. Then putting the two straight pieces which he had cut off by the side of the piece of the card that was left, and that was still a horse-shoe shape, he made one cut right across, cutting through the two pieces already detached, and also through the two shortened arms of the horse-shoe. This divided the card into seven pieces, as was desired, and the problem was therefore solved in the manner shown in the above picture.



How the two cuts are made in the horse-shoe card.

THE NEXT THINGS TO MAKE AND THINGS TO DO BEGIN ON PAGE 4921.

A beaver at Work on His Dam.

CANADA AND THE FUR TRADE

CONTINUED FROM 4328

A FEW years ago, Quebec celebrated the three hundredth anniversary of the beginning of the fur trade in the western hemisphere. Trading in furs was the leading enterprise of the Dutch during the short period of their supremacy. It was the chief occupation of the English during the first century of their rule over the thirteen colonies and was the chief interest of the French in the days of their supremacy in Canada. In extending the fur trade, Alexander Mackenzie discovered the Mackenzie River and made his way across the Rocky Mountains to the Pacific Coast. David Thompson discovered the Thompson River, and Simon Fraser followed the course of the Fraser River to the sea. People now realize that the trapper, the hunter, and the fur trader have performed invaluable services in exploring and civilizing America.

THE FRENCH, THE FIRST FUR TRADERS

The French commenced the trade. Shortly after Columbus discovered America, Frenchmen were fishing for cod off the Banks of Newfoundland. These fishermen discovered the natives on the neighboring shores had valuable furs for which they were ready to take mere trinkets. Soon many gave up their fishing to devote their entire time to the more lucrative fur trade.

During the French rule in Canada the fur trade was considered by far the most important occupation of the people. The great profits in furs were the chief incentives to further exploration and colonization. In a few years, fur animals in the vicinity of settlements became scarce. Traders and trappers found it necessary to travel further and further inland. As early as the seventeenth century they traveled for months into unsettled wastes, trapping, hunting and trading with the Indians.

THE STORY OF THE "COUREURS DES BOIS"

The rule of the priests was almost as strict as that of the Puritans in Boston or the Quakers in Philadelphia. The church made strict laws against drinking and it was only allowed in Montreal at the annual fur fair, when all the townsfolk with their savage guests had been in the habit of becoming intoxicated from the first beginning of the fur trade. Neither the trappers, when they came home to squander their money in holiday making, nor the loafers of the cities, liked these restrictions. Many offenders in order to escape punishment sought the free and reckless life of the woods. It was then, for the first time, that the French trappers, hunters and canoemen got the name of *coureurs des bois*

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(wood-runners), which they retained ever after when in the service of the different fur trading companies. Rarely did they return to their native land. The wild roving life in the wilderness was too exciting to permit a voluntary return to the narrow limits of civilization. The wood-runner as a rule took to himself an Indian wife and got along pretty well with his squaw. In addition to hunting and trapping the wood-runners became canoe-men and freighters to the trading companies. To the half-breed children of these French and Indian parents descended the vocation of their fathers and the roving instincts of their mothers. To this class may be added a considerable number of "metis," the offspring of Scotch and English fathers and Indian mothers. Scattered over the vast western country, the half-breed has formed the advance-guard of civilization.

THE ORIGIN OF THE HUDSON'S BAY COMPANY

While the French were developing their fur trade, a strong rival appeared in the north, establishing its trading posts in the vast wilderness surrounding Hudson Bay. In 1670, King Charles II granted to a company the exclusive privilege of trading, and the full power of governing the district drained by the rivers which flow into Hudson Bay. This great district was called Rupert's Land because Prince Rupert, the king's cousin, was the first governor of the company. The corporation, the pioneer in its field, and the one which to-day is the largest fur trading enterprise in the world, is the Hudson's Bay Company.

The company built many trading posts on the shores of Hudson Bay and from these forts carried on their trade with the Indians. In June vessels left England with merchandise and in September started homeward, laden with furs collected from the various trading posts. Guns and ammunition usually formed a large part of the cargoes sent to America. The company, being a trading corporation, did not make any attempt at colonization. It aimed to preserve the forests as breeding places for animals and to keep settlers out.

INVASION OF RUPERT'S LAND BY THE FRENCH

In order to get furs, the Hudson's Bay Company sent its traders to the Indian tribes inhabiting the vast wilderness to the south. They succeeded in turning a great amount of Indian trade from the French to the northern posts. This aroused the anger of the French, so that in June, 1686, they fitted out an expedition and sent it northward to drive their rival from the Hudson Bay district. The French captured all the leading trading posts, and seized many valuable furs. During the European wars of the next few years, of which we read in the story of Germany, the posts changed hands many times. The end came with the Treaty of Utrecht in 1713, when King Louis of France surrendered all his claims to Hudson Bay and the surrounding territory. After the peace, the company rebuilt many trading posts destroyed during the struggle, and opened new stations in remote places. The trade increased rapidly and by the middle of the eighteenth century was very profitable.

THE NORTHWEST COMPANY AND ITS BEGINNING

The change of flag in Canada brought a great number of Scotch merchants to Montreal and Quebec. It was not long before they learned of the profits of the fur trade and engaged extensively in it. In 1783, the chief traders founded the famous Northwest Company. The new company engaged more than two thousand *coureurs des bois* who had been trapping on their own account since the English conquest. These French Canadians rendered valuable assistance, as they knew every path and stream from Labrador to the Rocky Mountains. Within a few years trading posts of the Northwest Company could be seen down the St. Lawrence, up the Ottawa and the Great Lakes, across the prairies to the Rockies and northward by the Athabasca and Mackenzie Rivers to the Arctic circle. Their headquarters were at Montreal while the chief trading post was first at Grand Portage, and afterwards at Fort William on the northern shore of Lake Superior. Each year, a solemn meeting was held where the wealthy members of the corporation made a demonstration to terrorize their savage allies and dependents.

THE CLASH BETWEEN THE TWO GREAT FUR COMPANIES

It was inevitable that the competing companies should clash sooner or later. They were divided by blood and religion

WONDERFUL GAME FOR THE HUNTER

This is a Peace River Black Bear who when he was born was only just as long as this page! His principal food is vegetable, including honey, and in the autumn he accumulates large stores of food inside his own skin.

Courtesy Canadian Pacific Railway.

as well as by trade jealousy. The employees of the Hudson's Bay Company were Scotch almost to a man, while those of the rival were chiefly French Canadians or half-breeds and ardent Roman Catholics. When they came together, they were always ready to fight, employing all the cruelties of Indian warfare. The companies first came to blows on the Saskatchewan. The Northwest traders were in possession of the Saskatchewan valley, claiming they were the legitimate successors to the old French explorers. The Hudson's Bay Company also laid claim to the rich fur region. Neither would give way, so open warfare broke out. Forts were destroyed and fur stores fired. Ruffians and murderers in the employ of both companies wreaked vengeance on the enemy. Men were murdered; women and children were tortured with all the cruelties known to the Indians. If forgotten graves could give up their secrets they could tell many a tale of massacre, of violence and of treachery between Fort Garry (now Winnipeg) and the Rockies. Neither company cared to keep records of this brutal warfare where massacre, murders and torture were committed by paid assassins. Finally Sir George Simpson, a young Scotchman, was appointed head of the older company. He brought peace and union, in which the Northwest Company lost its separate name and organization, and the Hudson's Bay Company once more had the monopoly of the great fur country. This was in 1821.

THE SALE OF RUPERT'S LAND TO CANADA

The growing national sentiment took shape in 1867 when, as we read elsewhere, four provinces were united into the Dominion of Canada. A desire soon arose to expand westward and northward. At last, the company was induced to surrender all its rights to Rupert's Land. The Canadian government paid the company one million five hundred thousand dollars and allowed it to hold all its posts, ten acres of ground around each of them, and to retain a twentieth of all the land within the fertile belt between the Red River and the Rocky Mountains.

British Columbia, where the Northwest Company had established many forts, already had a government of its own, and shortly afterward became part of the Dominion.

The transfer of Rupert's Land was made to the Dominion in 1870, just two centuries after Charles had granted the charter to the company. The Hudson's Bay Company lost the political power which it had wielded for two hundred years over a large part of North America. It still gains a large revenue from the trade in furs, and it shares with the Dominion government in the profits which the sales of land bring through the extension of the area of cultivation. During 1910 the profits from land sales amounted to over a million dollars.

The fur trade was thrown open to all, but for many years few competitors entered the field. About 1890, however, independent traders were attracted to the fur regions. In 1901 Revillon Frères, a wealthy French company, opened many trading posts in the far north and now secures a large share of the best furs. A few small companies have entered into the trade. The old company still remains the greatest fur company in the world. It exports about two-thirds of the furs sent from the north and one-half of those sent from the whole Dominion.

THE BEAVER SKIN, THE MONEY OF THE FUR COUNTRY

A peculiarity of the fur trade is that money values for ages were unknown and are to-day in many of the trading posts. Everything is measured in terms of skins. The skin is a very old term and is based upon the standard of the beaver skin or, as it is called, "made-beaver." A "made-beaver" is the skin of a full-grown perfect beaver, killed in season, properly cured and weighing from sixteen to twenty ounces. It is the uncoined money of the north. The skin does not pass in transactions, but is the unit of value or standard, in terms of which furs or goods are measured. Traders have small sticks to represent it, and these pass as money at the stores.

HUNTERS AND TRAPPERS IN THE WOODS

The expert hunters and trappers of fine furs are the wood Indians, and from them are traded the greater part of the furs that come from the north. Generally peaceful, they pride themselves upon an honesty unknown to the lawless tribes of the plains. While a trader was visiting a neighboring post an Indian came to exchange his furs for goods. Finding the door locked, he broke in, took what goods

he needed and left what he considered a fair value in furs. Six months later the Indian came back to see if he had left enough furs for his goods.

By the beginning of November, the animals have their winter coats and fur is in season or prime as it is called. The trapper, who has taken his residence in some favorite locality, now prepares to lay out his trapping walk. He leads a solitary and dangerous life. To be alone in the trackless forest demands a courage and endurance of no ordinary kind. Silently he trudges along; for the trapper must not frighten away the animals by whistling or singing. The cold is below zero but the fur will be the finer. Fatigue and cold often exhaust him. A snow storm may overtake him; the bearings and landmarks are lost and forgotten and he who has promised a speedy return may perhaps be seen no more.

As the trapper enters the forest, his keen eyes scan every mark upon the snow for the tracks he seeks. He reads signs left behind by a passing animal as readily and truly as if he had been present and witnessed the whole scene. It matters little whether they are fresh or half blotted out; he never makes a mistake in his reading of the language of tracks. When he observes the footprints of mink or marten he unstraps his pack and starts to set his traps or to make his deadfalls. These he scatters over a long line of country, it may be ten or fifteen miles in length. Once a week, he starts forth to visit his line, gathering the furs caught, repairing the broken traps or deadfalls and setting them again.

"THE EVIL ONE," THE ENEMY OF THE TRAPPER

The greatest enemy of the fur hunter is the wolverine, or North American glutton. He follows the trapper's footsteps and destroys the animals as they are caught. This curious animal has a long body mounted on short legs of great strength. His large and powerful feet are armed with sharp, curved claws. There is not living a more cunning and crafty animal. During winter months he lives by stealing from the traps of the hunters. He hunts day and night for the trail of man and when it is found follows it unerringly until he arrives at a trap or deadfall. He will destroy the animals caught and also the traps. When once a wolverine has established himself on a trapping walk, the hunter's only chance of success is to change ground. Such serious injury does the wolverine inflict that he has received from the Indians the name of "Evil One."

THE GATHERING TOGETHER OF FURS FOR MARKET

At the end of March or the beginning of April the trappers leave their hunting grounds and make a journey to the trading post with the result of their winter's toil. In their march through the forest they present a motley throng, not men only, but women, children and dogs. The braves march in front, too proud and too lazy to carry anything but their guns, and after them the squaws, either carrying loads or driving dogs attached to sleds laden with meat, furs, household goods and infants. Day by day, they plod along until the post is reached. Sometimes they are met by independent traders or rival companies and are induced to sell their furs. Traders frequently visit the hunting grounds, carrying with them goods, and exchange these for furs. There are many Indians who never visit trading posts but do all their trading with the traveling traders. This, however, is rather the exception than the rule. If our trapper does not dispose of his furs, he will in due time reach the trading post. The trader values each pelt, adds the amount together and informs the Indian that he has fifty or sixty skins. The Indian pays for the goods advanced the past season and then picks out the articles that he needs until he exhausts his supply of small sticks, each of which represents a beaver skin. Some years ago, a trapper with his household arrived at Edmonton. He had a couple of silver fox skins among his furs and so his pack brought a handsome sum. After supplying his wants, he traded what he had left for a baby grand piano. It was placed in front of his tent and his children were allowed the free use of it. When the time came for his return, he took a hatchet and smashed the piano into pieces, declaring that he wanted to know where the noise came from. Having spent his money and with only provisions for the season, he and his family turned towards the forests for another winter in the wilderness without the comforts his foolish purchase had cost them.

TRADING WITH TREACHEROUS INDIANS

Sometimes traders have had to deal with treacherous Indians like the Blackfeet. A Blackfoot, if he thought a trader was deceiving him, might not hesitate to shoot him. Every precaution was taken to protect the trader. There is in the old forts a large room called the waiting room with a connecting hallway into the trading room. The hallway has a door, and when it slid back, two Indians with their furs were allowed to enter, and the door closed. The braves were admitted into a room divided into two parts. The partition is very strong and stoutly built. It contains a square opening with protecting iron bars. The Indians bartered their furs, a door opened and they departed before others were admitted. The trader had always to be on the lookout because he could not tell at what moment the Indian might be dissatisfied with the exchange and might show his displeasure by deliberately shooting at him. In earlier days, the Indians after they got back to the waiting room often thought they had been cheated and at once commenced to fill the ceiling with bullets or slash the walls with their hatchets and knives. These days are over but there was a time when trading with the Indians was very exciting and dangerous.

THE PAY OF THE TRAPPER FOR HIS WINTER'S WORK

A good year's catch per man is about five hundred dollars, but the average is nearer two hundred. The Indian remains at the post until all is spent and then borrows on his catch for the following season. The Indian has a peculiar code of ethics. If he deliberately set his traps and no fur animals come, he considers his debt cancelled and is therefore ready to open a new account. It is impossible for the storekeeper to collect the old debt.

EDMONTON, THE GREAT FUR MARKET OF CANADA

Edmonton, in the province of Alberta, is the greatest market for raw furs in Canada. More than a million dollars in value are shipped yearly from this city. It is the great trading centre for the Hudson's Bay Company. Many independent companies as well as individual traders have their headquarters at this place. Winnipeg and Montreal are also important centres of the fur trade. The greater part of the furs are sent to London, England, where they are sold at public auction.

THE ORGANIZATION OF THE HUDSON'S BAY COMPANY

There are about three hundred and fifty fur-trading posts in Canada, and of these, two hundred and fifty are owned by the Hudson's Bay Company. The company is a wheel within a wheel, consisting of the company proper, which furnishes the capital stock, and the partnership of the Fur Trade, which is employed to carry out the workings of the business. Under the charter, the supreme control of its affairs is vested in a board consisting of a governor, deputy governor and committee of five directors, all annually chosen by the stockholders at a meeting held each November at the company's house in London. These officials delegate their authority to an officer resident in Canada called the Governor-in-chief of Rupert's Land, who acts as their representative. His commission extends over all their Canadian possessions and his office-holding is unlimited as regards time. The authority of the Governor-in-chief is supreme except during the session of his council, which is held once a year and continues its sittings for two or three days. The Governor is chairman of this council, at which he represents the interests of the Board of Directors in England. The council is composed of the highest rank of officers in the service, called chief factors, whose duty and right is to sit at its meetings whenever their attendance is practicable. Members of the second rank of commissioned officers, called chief traders, when they can arrange to be present are also requested to sit in the council. The chief factors and chief traders together constitute the partnership in what is called the "Fur Trade." Vacancies in its ranks are immediately filled as they occur from the death or retirement of its members, the qualification necessary being a majority of the votes of all the chief factors. The candidates for a factorship are necessarily traders, while those for a vacant tradership are from the ranks of salaried clerks, seldom of less than fourteen years' standing in the service.

The members of the Fur Trade also called "Wintering Partners" furnish none of the capital stock and receive

SEA OTTER AND SILVER FOX

The rarer the animal, the more sought after the skin, and as much as $10,000 is sometimes paid for a single fur garment. Among the most valuable skins are those of the silver fox of Northern Canada, and the sea otter of the Pacific coasts. In the upper part of this old picture we see an Eskimo waiting, spear in hand, for the sea otter to come to the surface. The bells, with the strings connecting them with the shallow sea way, were to give warning of the presence of the otter. The circular picture shows what the sea otter is like. Few of these animals are left, and the hunter usually has to go out to sea, at the risk of his life, to find them. The lower picture shows a fur trader, bargaining for the skin of a silver fox. It has been found that these beautiful animals will live in captivity, and of late years efforts to keep them on fur farms have been made, as you may read elsewhere. Some of these farms have been successful in rearing the cubs.

their commissions merely as the reward of long and faithful service. Their pay is a definite number of shares of stock, never exceeding a certain limit. Of these a chief factor possesses two, and a chief trader one, so that their incomes are directly affected by the fluctuations of the trade. At present the income of a chief factor is about five thousand dollars including house and keep for himself and family, while that of a chief trader is half of that amount. The Fur Trade is organized under a grant made in 1834.

RECRUITS FOR THE SERVICE

Successful applicants for a place in the Hudson's Bay Company's service are from sixteen to eighteen years of age. They must pass a rigid examination in education, moral character and physical build. The company has found its best recruiting grounds in the Highlands of Scotland. Many are born in isolated glens. They change the land but not the climate, and as for the circumstances, they have opened careers for their ambitions. They sign for a term of five years, although the direct understanding is that the applicant shall devote his life to the trade. This happens in nearly every instance, as the mode of life unfits him for active duty in any other vocation. When an opening occurs the recruit sails for the company's headquarters at York Factory. His salary at first is one hundred dollars a year with his lodging and board.

THE SERVICE

On arriving at York Factory, he is generally sent to pass the first five or ten years of his apprenticeship in the extreme northern districts of Mackenzie River and Athabasca. The occupations of his first years are those of salesman behind the counter in the trading-shop and an occasional trip with the half-breed traders attached to the post to the various Indian camps in the vicinity for the barter of goods for peltries. A few years pass and he is promoted to the accountant's office. At the accountant's desk the apprentice, now known as a clerk, remains generally until fourteen years of service have passed, unless placed in charge of a post as chief clerk. During this period, he has been gradually nearing the great trading posts which form the headquarters of a district. His salary has increased from one hundred to five hundred dollars per annum. His habits of life have become fixed and he has no desire for change. His ambition points but one way, to a higher rank in the service that he has chosen.

At the expiration of fourteen years of service, if a vacancy occur, the clerk steps from the ranks of salaried employees into the partnership of the Fur Trade. Upon the assumption of this dignity he is appointed to the command of some important post. Here his duties are a general oversight of the business immediately connected with the establishment and vicinity. In a short time death or retirement opens the way for entrance into the ranks of chief factors, the highest class of officials known to the service. In the exercise of the duties of this office he assumes control of a district in many cases as large as a European kingdom, with headquarters at the largest post within its limits and a general supervision over all the other posts. He directs the course of trade, erects new establishments, orders the necessary outfits for the year, and in his capacity as chief magistrate of his principality, with a commission from the government of the Dominion, he rules supreme.

Before 1870, the commissioned officers exercised almost supreme power within their districts. Removed beyond the reach of law, they were a law unto themselves. Their government, though arbitrary, was excellent as far as the Indians were concerned. Any criminal was relentlessly sought out and hunted down. Consequently outrages came to be almost unknown and the posts could have been left unprotected. They were fair and just but severe in their punishment, and gave the country an excellent government. In the two centuries of their sovereignty, not a single Indian rising stained with bloodshed the land over which they ruled.

The fur traders of Canada have had an important place in the history of the Dominion. In his quest for furs, the trader explored the country. The great companies held it with their forts until the nation began to grow, and the time came that the waste places were needed to be filled up with the habitations of man. Then they stepped aside, and a settled government took their place.

THE NEXT STORY OF CANADA IS ON PAGE 5221.

TRADING POSTS IN THE FAR NORTH

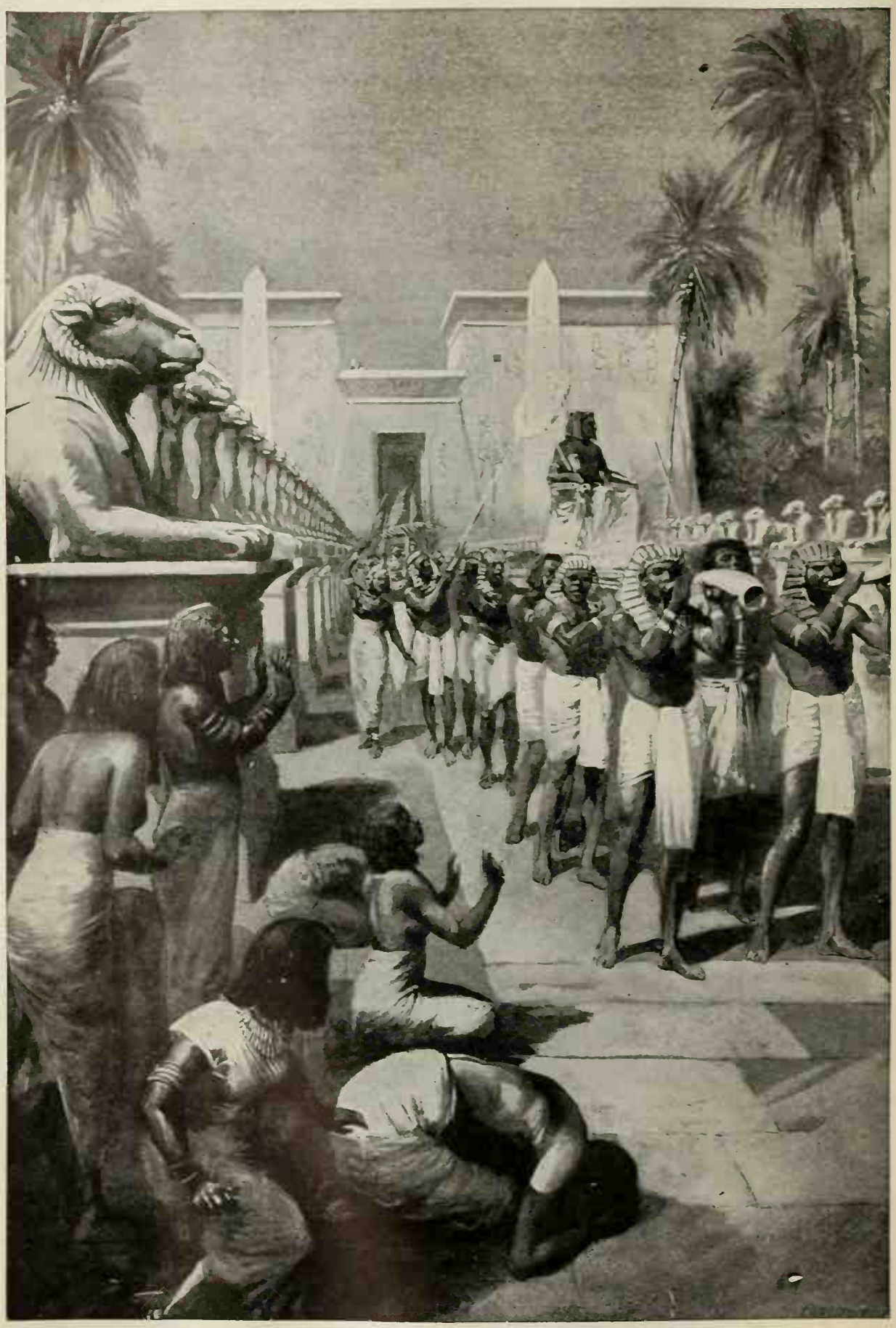
Here is a post in the far Northwest with the agent in charge at the door. The tall man in white is a Russian who has drifted across the Pacific to trade in furs. The toboggans are ready to start.

The agent at this post is loading the sled, which is really a toboggan, that is, a flat board without runners. This sled is best for soft snow, and from the snowshoes we know that is what is expected.

At this post on the Buffalo River, the dogs are harnessed and the sledges are about to start. The people you see are half-breed Indians employed by Revillon Freres. The woodpile is in the foreground.

Pictures by courtesy of Revillon Freres, New York.

A PHARAOH ON HIS WAY TO THE TEMPLE



The magnificent temple of Ammon at Karnak was the greatest of Egypt's ancient glories. To its shrine the Pharaohs went with all the state and pomp that it was possible to assume, and as they proceeded up between the impressive avenue of sphinxes, amid the sounds of music, to the portico of the temple, they were regarded with reverence by the onlockers; for, when the Egyptian monarchs went thus to worship, they were supposed to represent in their person the whole of the nation. Ammon was usually represented as a ram.

THE DEAD EMPIRES

ONE of the most famous sayings ever written is the great saying of Paul: "The things which are seen are temporal; but the things which are not seen are eternal." Empires pass away, and nothing remains of them but the unseen things that made them great. Many great empires have existed in the world of which not as much as a shadow remains to-day. Thousands of years ago they rose, and grew, and flourished, and then decayed, because not all their power and wealth could save them when cruelty and selfishness and bad government crept into them. We have already told much of the story of the nations on the earth to-day, and now we tell the story of these fallen empires, and no story in our book brings home to us more deeply the truth that the greatest power in the world lies in things we cannot see—in love, and truth, and hope, and faith, which have never passed out of the world, but without which even empires perish.

EGYPT'S WONDERFUL STORY

CONTINUED FROM 4611

WE gladly make our way to the country shaped like a lotus lily with a long stalk, lying on the bosom of the hot and sandy mid-world desert. For when we glance—in the story of Africa—at the country as it is to-day, and at its history during the last 2,000 years, we are reminded at every turn that a great and wonderful past lies behind those years. We cannot help seeing the stupendous work which that past has left scattered over the face of Egypt, so vast are the buildings and ruins standing on the banks of the Nile and on the edge of the desert.

Ramases II

And so it is that, deeply interesting as we find that ancient land to-day, we cannot help feeling that the true glory and greatness of Egypt lie in long distant times.

We know that the peoples who first invented writing were well advanced in civilization before they began to think of a way of telling their deeds to those who came after them. This was the beginning of history, and the earliest written history of the kings of Egypt that has come down to us was probably inscribed more than six thousand years ago.

It is as difficult to understand the meaning of this vast expanse of time as it is to take in the details of a far-spreading view from a mountain-top. We need a strong glass to help us pick out the villages, fields, woods, and streams, and the signs of life that lie before us hidden in the blue distance. And so to find out the deep interests and beauties of this great view of Time, we must gaze steadily and earnestly into its far haze, using every help that comes to us to strengthen both our sight and our imagination.

The pyramids which we see upon page 4843 will help us; they rouse our curiosity as we look at modern Egypt, and consider the fine crops and wonder at the Suez Canal, and the great dam at Assuan. So let us now without delay mount to the top of the Great Pyramid, as the largest of the three pyramids near Cairo is called.

We shall not find it an easy climb, for it is more than 450 feet high, and the rough blocks of stone, which we have to use as steps, are many feet high. But two strong Arabs in flowing white garments will push and pull us all the way up, chattering broken French and English, till we arrive breathless at the top, where the point is now so much worn down that there is room for several people to stand and admire the wonderful view. There below us is the full, flowing river, which, except in the bad famine seasons

that have come from time to time through the long history, has risen yearly from its bed and fertilized those green and yellow fields with its water and mud. During all those years, perhaps 6,000 and more, the glorious sun, day by day for over 2,000,000 times, has risen from out of the tender-glowing colors of the dawn beyond the eastern desert, has traveled in glory across the busy, fertile Nile valley to its evening setting in a blaze of gold and crimson behind the grim, silent hills of the western desert.

No wonder that the sun, the giver of life, held ever chief place among the gods of the old Egyptians. And each night, after its disappearance, the deep purple sky, ablaze with dazzling stars in the clear air, has ever covered, as with a curtain, multitudes of tired workers, and countless generations of them, not only those whose daily labor was in the fields, or keeping the embankments in order, or raising the water where needed, all through the long centuries, but builders and workmen of all descriptions without number.

THE MIGHTY ARMY OF MEN WHO SET UP EGYPT'S SPLENDID BUILDINGS

Grand and immense buildings, such as those we see by the banks of the Nile, exist only as the result of the movement of material—hard and laborious work indeed—by thousands of human beings.

As we come down the pyramid let us try to realize that the great mass is solid, except for the passages and the funeral chambers to which they lead. Few care to penetrate into the heart of a pyramid. The next time we walk across Madison Square, one of the largest squares in New York, we can shut our eyes and be led along till we reach the middle, and try to imagine what it must be to walk for that distance in a low and slanting dark passage, very hot and close, into a most lonesome, oppressive silence, out of the bright glare of day.

The base of the Great Pyramid is almost exactly the same size and shape as Washington Square in New York. What a scene must have been the building of such a mass, with such a base and such a height, so many centuries ago! We know what a dusty, busy scene it is when a large church or public building is being erected, when bricks and stones are brought up by heavy motors, and every sort of appliance is ready to hand.

But the huge granite facing-stones of the pyramid had to be quarried near the great dam at Assuan, and brought down the river for several hundreds of miles—almost as far as from Detroit to New York—and then, with enormous toil, men had to drag, push, and roll them over the burning sands.

THE HUNDRED THOUSAND SLAVES WHO BUILT A KING'S TOMB AS HIGH AS A HILL

The rest of the masses of material were equally difficult to obtain. And let us think of the stupendous work of getting it all into place by means of pulleys and rollers and the most exact human skill in masonry ever known. It is said that 100,000 slaves took part in this huge work.

We may well wonder what was the object of building tombs and pyramids at such immense cost and labor. As far as we know, it was solely for the honor and glory of the reigning king, and to provide a secure resting-place for his body after death. Long before the great pyramids were begun, smaller pyramids and temple-like tombs had been erected. Such a tomb was built, perhaps 4,500 years ago, by Prince Perneb, a court official. The walls were covered by paintings and inscriptions by the artists of his time, and when he died he was buried in a rocky burial chamber far down below the tomb. During the ages, the sand of the desert drifted over it; rubbish from the destruction of near-by tombs was cast upon it, and it remained unknown until after the twentieth century had begun. Then it was discovered, taken down stone by stone, and carried across the ocean to the Metropolitan Museum. There it was set up again, and the children of this new world may learn from its painted walls how the people of that ancient world lived and dressed and what they ate in those far-off days. One of the chief points in the religion of the old Egyptians—that wonderful religion which changed so little during its long history—was to arrange, so far as means would allow, for preserving the body, as long as possible, whole and entire. This they did by making mummies of the bodies, by soaking them in a strong kind of soda, and bandaging them very carefully, and then putting them in decorated coffins, which were hidden away in great stone vaults in rock tombs, and in the pyramids, where it was hoped that no

THE FIRST GREAT WONDER OF THE WORLD

Of all the marvelous monuments that remain to-day to tell us of the power and glory of the past, the Pyramids of Gizeh, which we see here, are the most amazing. The largest of these, known as the Great Pyramid, was built by a Pharoah named Khufu or Kheops for his tomb, nearly 6,000 years ago. It is the largest building in the world, and was originally 476 feet high. The area covered by it is more than 580,000 square feet.

one would ever be able to find or disturb them.

PHARAOHS WHOSE FACES WE MAY SEE IN OUR MUSEUMS TO-DAY

Alas!—for the last 3,000 years at least—from time to time robbers have broken into the tombs, and disturbed what they found; and in our own days we can see, under glass cases in our museums, specimens of the mummies of the great ones of Egypt brought once more into the light of day, after having lain in the dark silence for long centuries.

Perhaps we are wondering why the robbers of old were so anxious to break into the tombs, for they could scarcely care for the mummies themselves. It was the treasure that was buried with the mummies that attracted them; for the Egyptians believed that, in some mysterious way, in the new life to which he had gone, the departed person would need the things he had owned in his earthly life. So with the mummies of royal and rich persons were put their valuable ornaments and their possessions, besides furniture, clothes, and food for the use of the spirit of the departed, and the quaint little figures that were supposed to do the work that would be required in the fields of the land of peace.

WHERE WE CAN SEE TOYS THAT CHILDREN PLAYED WITH IN EGYPT 3,000 YEARS AGO

It is the sight of these personal belongings that brings us into such close touch with the Egypt of 3,000 or 4,000 years ago. There are in the British Museum cases full of such treasures as the dolls with clay beads for hair, and the toys and little worn shoes and sandals of the children; the dressing-cabinet of the fine lady, containing ointments for the eyes; also elbow-cushions and dainty, pink kid slippers. We have, too, the palette and paints of the scribe, the musical instruments of the musician—in short, hundreds of articles of everyday use that bring us face to face with the people to whom they belonged centuries ago.

In the Metropolitan Museum there are models of slaves at their homely tasks about the farm-houses; of granaries such as we read that Joseph built; of boats on the Nile with the men who rowed and sailed them, dressed in the garb they would have worn in their daily lives thousands of years ago.

These were all placed in the tombs, and besides these there were always put beside the mummy representations of the numberless gods to whom the Egyptians prayed, and to whom they erected wonderful temples, whose ruins still form one of the sights of Egypt.

THE STRANGE PICTURES AND SPLENDID TEMPLES OF ANCIENT EGYPT

There is a great group of these temples on the Nile, where the magnificent city of Thebes once stood, far on the way to Assuan. The great halls, imposing gateways, and rows of pillars form a beautiful sight in brilliant sunshine, and deep purple shadow, and, as we gaze at them, we fancy them once more in their first beauty, with long processions of chanting priests and priestesses, and gorgeous display of kingly magnificence when the king came to pay his worship, amidst the stately monuments of gold and silver, adorned with ivory and precious stones. And even yet we have not come to the end of our close touch with the past in Egypt, for we can now read the actual message across the years, written in the ancient Egyptian picture language, which had died out and been completely forgotten after the Roman times in Egypt.

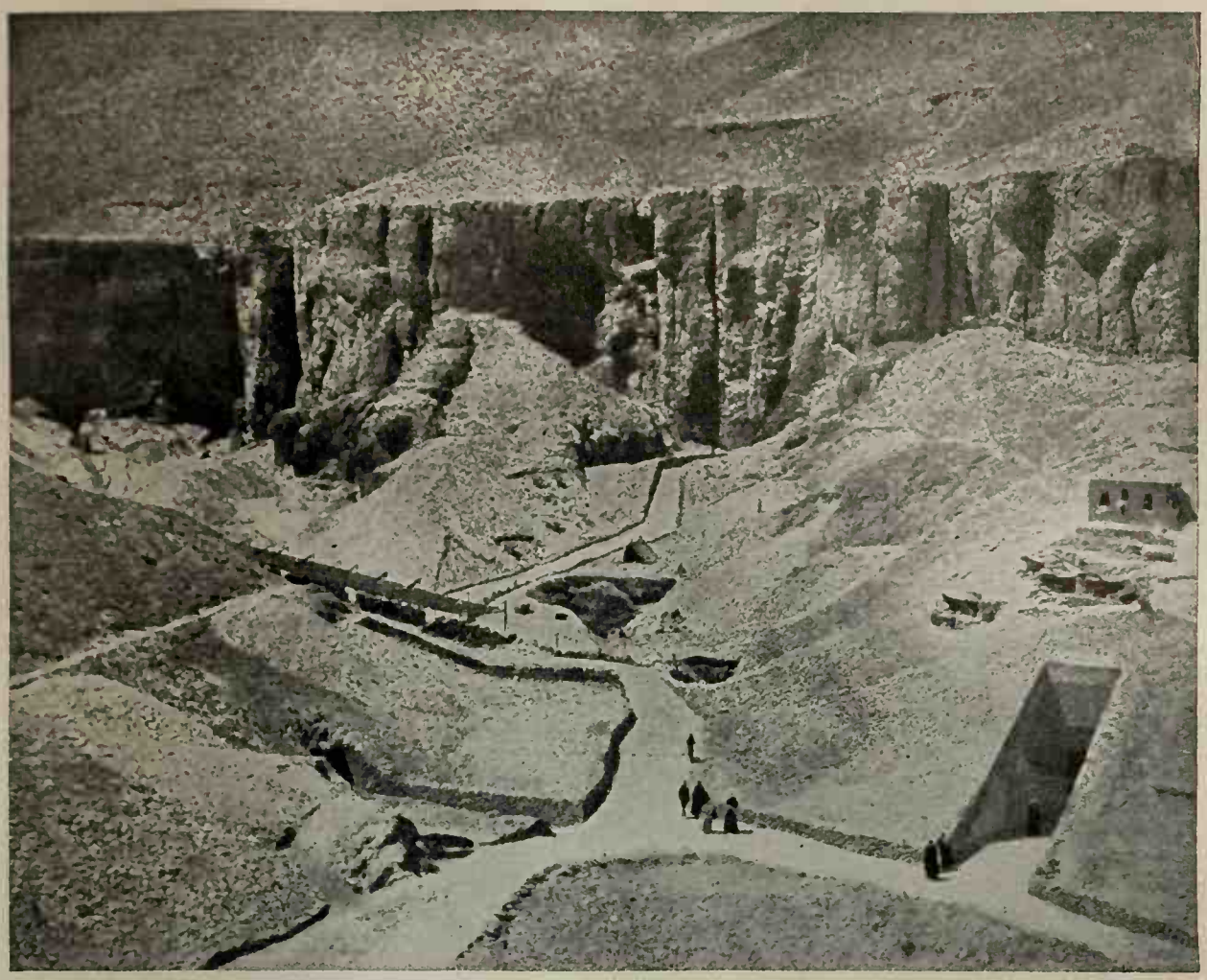
If we look at the walls and columns of the temples, at the solid vaults, at the coffin-cases, at the sculptures and the wall-paintings, we shall find most of them covered with this picture writing. Until a century ago no one could guess what it all meant. Then an engraved stone was found at Rosetta, near Alexandria, now carefully preserved under glass at the British Museum, which has served as a sort of key to unlock the mystery. We see a picture of this stone on page 3481.

HOW MEN SOLVED THE RIDDLE OF THE ANCIENT WRITINGS

On the stone is a certain decree about keeping a king's birthday, and the same decree is given in three different kinds of writing. The lowest is in Greek, which scholars know well; the top is in the Egyptian picture writing used on the monuments, and the middle one is also in the Egyptian language, but in a more running kind of writing used for everyday purposes by the people.

Learned men, who love to find out the puzzles of the past, set to work to translate this decree. They compared it with certain lists of kings' names they had

OPENING THE TOMBS OF THE PHARAOHS



The Rocky Valley at Thebes, where men are still searching for the tombs of the kings.

Opening the tomb of a king who has slept in the mountains for over 3,000 years.

already studied, till at last it was all straightened out, and the values of the signs discovered, so that we can now stand by and listen to those who know hieroglyphs, as they translate the old Egyptian writings as easily as if they were in English print.

And this discovery and study have also opened up to us the old books and chapters of books constantly found in the tombs. These were in long rolls, or *papyri*, so called from the material on which they are written. This is the inner part of the papyrus reed, that grows in such profusion on the Nile banks, and from which we get our word "paper."

The work of the scribes was to make copies of these papyri. The one most copied is called the Book of the Dead, parts of which are believed to be older than the pyramids themselves. Certain chapters of this book were always laid beside the mummies, to instruct them what to say and how to behave in the underworld. Part of a chapter was painted on the outside of a mummy coffin which is now in the Metropolitan Museum, and this we may learn to read ourselves. There is no end to the interest of the Book of the Dead, not only on account of its entrancing illustrations, but also for the teaching it gives about the religion of Egypt, and how men tried to fit themselves in life for a happy hereafter; and how they expected to be judged, and how they believed they would live and work on their way through the underworld. The British Museum has a fine copy of a large number of its chapters, and we can return to study it again and again, finding something fresh and interesting every time.

Besides this and other religious books, there are many other papyri of great age, and they include fairy-tales, war poems, medical and astronomical books, and also lengthy instructions as to behaviour.

Every year diggings and explorations are being carried on in the search for more temples and tombs, inscriptions and papyri, to fill in the gaps in our knowledge of the story of old Egypt.

AN EGYPTIAN KING WHO REIGNED NEARLY SEVEN THOUSAND YEARS AGO

Scholars are inclined to put back the beginning of that story farther and farther. The first historical king of all Egypt is put by some in the forty-fifth century before Christ. Some think that Menes, who turned the course of the Nile, lived much earlier. Before him there are legends of god-kings and heroes, and kings of small states. Specimens of very old pottery, with pictures upon it of soldiers and boats, strangely like children's drawings of to-day, give an idea of the first known life on the Nile long before Menes.

For the sake of convenience, in dealing with the great number of kings who followed Menes, we generally group them into thirty or more dynasties, or families, and the names are gleaned from the various lists of kings on tablets and papyrus, made from time to time through the centuries, which have come down to us. When looking at inscriptions we can always distinguish royal names, because they are surrounded by an oval line, supposed to be a cord tied in a knot to preserve the name from contact with common ones. This oval is called a *cartouche*. Before the king's name will generally be found some Egyptian words composed of a sign like an umbrella and an insect over two half-circles. These signs mean King of the North and South, for Egypt is such a long, narrow country that it was long divided into two parts, and so we often hear of the Double Crown, which is made up of the red crown of North Egypt, and the white crown of South Egypt.

THE KINGS OF EGYPT WHO CALLED THE SUN THEIR FATHER

Each king also called himself Son of Ra, or the Sun, which is shown by a goose and the round sun with a dot in the middle. The names of the kings are chiefly made up from about a dozen signs, which we meet with continually in every inscription.

Very little is known of the kings of the first three dynasties. It was under the rule of the fourth, perhaps—some say in the thirty-seventh century before Christ, others 1,000 years earlier still—that the three great pyramids near Cairo are believed to have been built by Khu-fu, by Kha-f-Ra, and by Men-kau-Ra.

If we would see the speaking features of Kha-f-Ra, and note how he sat to give audience to the overseers and officers of his great building works, we can find a cast of his wonderful life-like portrait in the British Museum. There he sits on his throne, surrounded by memorials of

PICTURES OF THE PEOPLE OF OLD EGYPT

Necklaces were an important part of the dress of the ancient Egyptians, and both men and women wore them. Here we see a necklace 3,500 years old. It is of gold, ornamented with shells and precious stones.

Owing to inroads of conquerors and settlers, Egypt was peopled by various races, and here we see, from sculptures thousands of years old, what some of the races were like. Numbers 1 and 2 show the aquiline, or eagle-nosed, type; 3, the Libyan; 4, the Amorite; 5, the curly-haired type; 6, the sharp-nosed type; 7, the short-nosed type; 8, the forward-beard type; 9, 10, and 11, the straight-faced type; 12 is King Kha-f-Ra.

In their custom of sitting on chairs, the Egyptians were more like modern Europeans than the people of the East. Their seats were not unlike ours, as may be seen in the picture from the chair with a back, which is 3,500 years old. The stool on the right folds up like a camp-stool. The other seat is of ebony, inlaid with ivory.

the officials who superintended the building of the second pyramid.

THE MERCIFUL KING, WHOSE BODY WAS LOST AT SEA

Of Men-kau-Ra the museum possesses part of his skeleton and the fragments of his coffin, with the inscription saying he was just and merciful. The rest of the coffin and mummy were lost at sea on the way from Egypt, whence they had been taken from the third pyramid. It is said that the sixty-fourth chapter of the Book of the Dead was compiled in his reign.

Not far from these Pyramids of Gizeh is an enormous monster, hewn out of the living rock, with a human head and the body of an animal—the Sphinx—so large that it could scarcely be got into the largest of our modern buildings. It is now covered with sand up to the neck, and only the immense head shows. From time to time through the centuries, the sand had been cleared away, and the shape shown, as well as the little temple built in between the great paws.

THE GREAT STONE FACE THAT HAS LOOKED UPON THE WORLD FOR AGES AND AGES

The face seems to look out to the horizon, as we can see by the picture on page 4175, changeless through thousands of years, except for the wear of time, and the wanton mischief done to it when Mohammedan soldiers used it as a target. It has a grand majesty of its own, and it has astonished some travelers to notice how like are the thick lips and the cast of face—modeled it is thought, even before the building of the pyramids—to those of some of the country girls of Egypt to-day.

Another striking likeness that connects far-away times with the present is found in the statue of a fat little farmer man, whose amusing face makes us smile; though we feel that his sharp eyes would soon find out any wrong-doing in those he had to oversee—perhaps four thousand years ago. When this statue was raised from the bed of sand and dust, where it had lain for centuries, the watching people called out in amazement: "It is the sheik—the chief—of the village!" And the statue keeps this name now.

HOW ABRAHAM ENTERED INTO THE BUSY LIFE OF THE NILE VALLEY

Many interesting tombs belong to this period of, perhaps, 2,400 before Christ. One of them has wall-paintings, representing the arrival in the country of a family, such as that of Abraham, the great founder of the Jewish race. The story of his visit to Egypt in search of food, when there was a famine in his own country beyond the Isthmus of Suez, is familiar to us in the pages of the Bible.

We can well imagine that Abraham would tell stories of this visit to Egypt to his son Isaac, that he in turn would tell them to his son Jacob, and Jacob to his sons, and, among them, to his favorite, Joseph. We read the story of Joseph when we were small children. Let us follow him again on his sad journey over the "Bridge of Nations" to slavery in Egypt, fitting in all we can to make real the daily life of the handsome lad, so cruelly torn from his home.

Baskets made like those in the Egyptian rooms at the Metropolitan Museum might well have been those which the chief baker carried on his head; the models of the granaries show how corn was stored, and bring to mind Joseph's great work of fighting the famine that lasted so long, because Father Nile brought too much or too little water to the wide fields.

JOSEPH AND HIS BRETHREN AND PHARAOH, WHO WOULD NOT LET HIS PEOPLE GO

Fashions changed so little in Egypt for centuries that we might imagine that the little statue of a treasurer was Joseph himself. We might fancy him earnestly discussing affairs of state with the king to whom he became as a son, or traveling down the Nile on a tour of inspection in a boat like the model in the case near by.

Very little is known concerning the history of Egypt at this time, for the kings who ruled then—believed to be a race of foreigners—destroyed monuments rather than set them up. But when these Hyksos, or Shepherd Kings, passed away, many famous names of builders and soldiers rose up during the years that Israel lived in the "House of Bondage." Among them was King Thothmes III., who inscribed and set up the great obelisks which we call Cleopatra's Needles—though the famous queen lived several centuries later.

One of them now stands in London, the other in New York. Thothmes III. was

KARNAK, THE GLORY OF ANCIENT EGYPT

In this picture we see the wonderful temple of the god Ammon at Karnak, restored so as to appear in all its ancient glory. It has been described as the noblest effort of architectural magnificence ever produced by the hand of man, and indicates the might and advanced civilization of the ancient Egyptians. An avenue of sphinxes led up to the doorway, and the great hall contained 134 mighty pillars, all brilliantly painted and carved.

one of the first kings of Egypt to make war across the isthmus, both on the nations in the mountains of Syria and in the valley of the two great rivers beyond the desert.

Then there was the great Queen Hatshepsu, who has often been called the Elizabeth of Egyptian history. She sent most interesting expeditions to discover unknown countries, and had an account of them, with fine illustrations, engraved on the walls of a magnificent temple she built near Thebes. But, interesting as is this strong queen, who tried so much to look like a man that she had a beard added to her portraits, we must pass on to the stirring times a little later when the descendants of Jacob, the children of Israel, had grown to be very numerous, and were grievously treated by the kings, or Pharaohs, as the Bible calls them, of the period. Rameses II. is believed to have been the great oppressor of the Israelites, and we can see his face in the huge stone monuments he set up, and more wonderful still is the photograph of his mummy, which has been found with those of many of his race and put into the museum in Cairo. Thus, the features into which so many looked with awe, perhaps the little Moses among them, are shown again to the world more than 3,000 years after the great king's death. In the Metropolitan Museum there may be seen an earthenware bowl, covered with blue glaze, and inscribed with the name of Rameses II., which may have belonged to the great king himself. There, too, is a door lintel taken from one of the temples that he built. As we look at it we wonder how many times his hand may have touched it as he passed in and out thirty centuries ago. Magnificent were the temples and monuments set up by this dynasty of kings, among which we find the massive ruins at Karnak and Luxor, near Thebes. Bricks such as the Israelites made for use in building store cities for their hard taskmasters, necklaces and jewelry such as they may have taken when they "spoiled the Eygptains," are here in the museum before our eyes. In the great museum at Cairo, and in the museums of many European cities, we may find endless objects such as the king's daughter may have provided for Moses, whom she rescued and brought up in the palace itself, with which to frame his life from childhood onwards. The toys and games, especially the animals, must have pleased him, and a garden with trees and a pond, like one that is pictured on a wall, would be de-

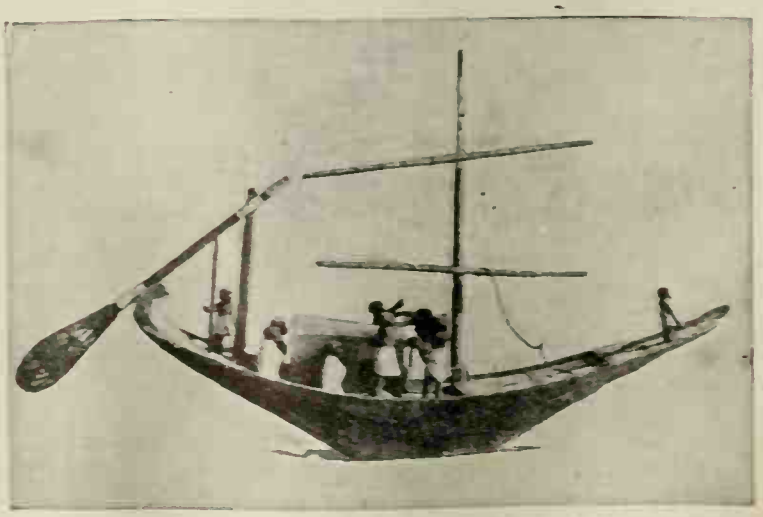
This is one of the brilliantly decorated columns in the temple at Dendera, shown on page 4851. There are 24 such columns forming the portico. The temple was finished about 1,900 years ago.

lightful for a child to play in. The little Moses may well have heard music from instruments such as those pipes and harps, and he must have enjoyed sailing and rowing on the Nile, in boats like those model ones on the shelves.

TOYS OF EGYPTIAN CHILDREN 4,000 YEARS AGO

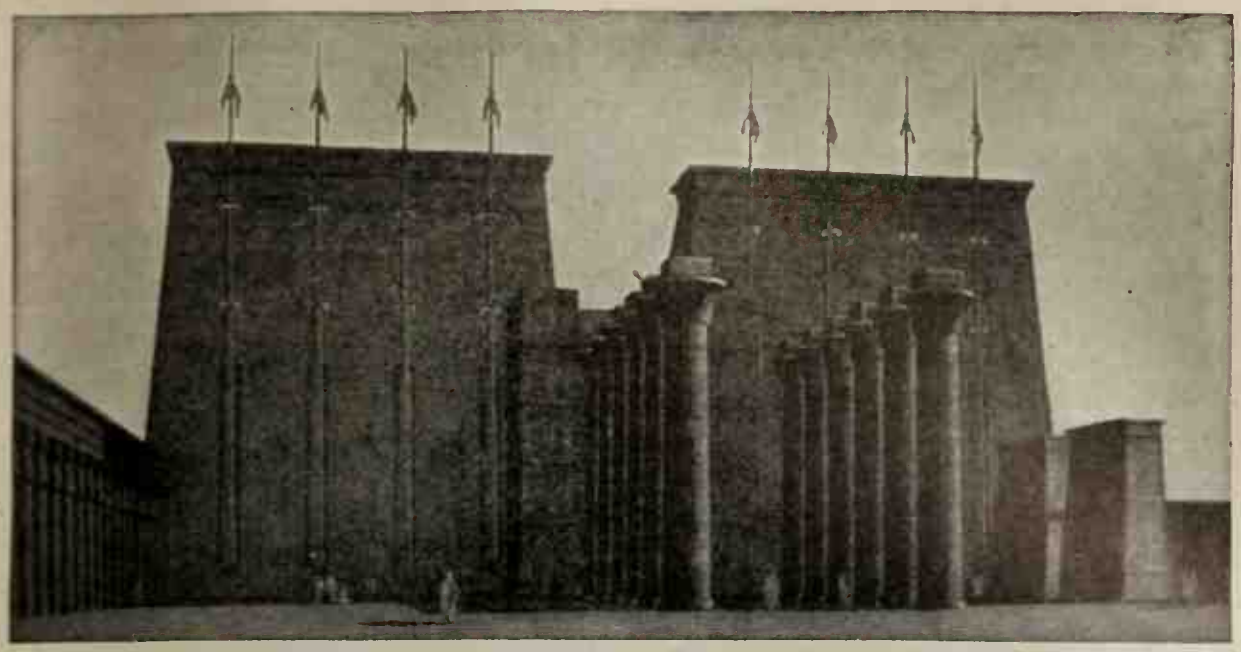
The wall-paintings from the tombs show in their bright colors how the Egyptians amused themselves in the time of Moses, and before and after. There are the gay parties with music and dancing; a father getting birds with a sort of boomerang, the child holding on to his leg for fear of falling out of the boat; the mother gathering lotus flowers; the family cat retrieving the birds three at a time. All this we can see on page 4852. And when the time came for lessons, those reed pens and red and black paints were the sort with which the boy must have learned to write. One can fancy his enjoying the possession of one of those boxes of pens and paint, and see him poring over the papyrus rolls which held so much of the learning of the Egyptians. The Ten Commandments, brought down from Sinai by Moses after he had left Egypt, are all shadowed in the forty-two commandments of the Book of the Dead. The making and worship of the Golden Calf, which so angered the great leader, was suggested by the ancient worship of Egypt, brought home to us in endless forms by paintings and images of every description, as well as by the mummied forms of the animals held in such sacred reverence. For about 1,000 years after this brilliant line of the Rameses dynasty, the history of Egypt, on the whole, was one of gradual decline and gathering trouble. It was during this time that the priests of the splendid temples became richer and richer and even more powerful, till at last they made themselves kings. When examining the mummies and their cases, we notice how many belong to priests and priestesses, door-keepers, incense-bearers, and other officers of the great religious colleges. Dynasties of foreigners followed the priest-kings, and the country was breaking up into little states, and everything going down, when the kings of Assyria — the land of the two rivers—saw their opportunity for conquest, and began to attack Egypt on her own frontier, and then pushed their way over the Bridge of Nations. They overran the whole of the country, spoiling the harvests, so that the people starved, and the fine temples and monu-

A DRESSING-TABLE 3,500 YEARS OLD

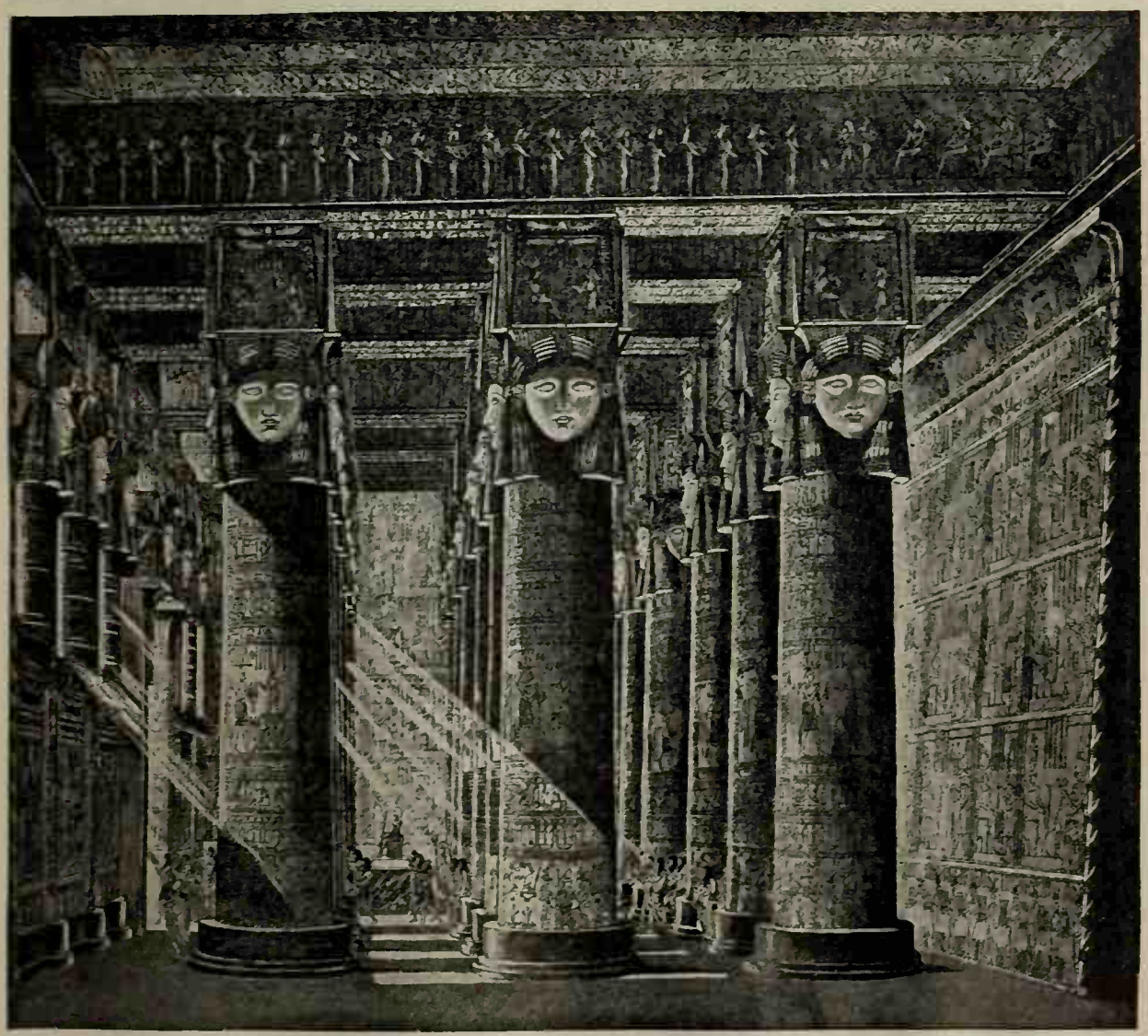


AN EGYPTIAN TOY BOAT MADE 4,000 YEARS AGO

THE MIGHTY TEMPLES OF ANCIENT EGYPT



This is how the outer court of the temple at Karnak must have looked in the days of its glory. This great temple was the work of several kings, during a period of many years. The entrance to the Hall of Pillars was through the double row of pillars in the centre of the picture and the great gateway beyond them. The Hall of Pillars, of which the colored picture gives us an idea, had an area of 50,000 square feet.



Here we see another of the magnificent temples of Egypt, that of the goddess Hathor at Dendera, restored. It is shown as it was when used for royal worship. This is not one of the most ancient buildings, being erected in the days of the Ptolemies, long after the rule of the Pharaohs had passed away. Through the massive, stately pillars, which bear the face of the goddess at their head, we catch a glimpse of a procession of priests.

ments began to fall into decay. We find the account of all this misery in the story of Assyria, where we find the description given by the conquerors with so much pride of their successes in Egypt. Egypt revived after this for a little while, only to be again devastated from end to end by the Assyrians, till they, too, fell under a new great power that arose in Asia, that of the Persians.

The Egyptians took every opportunity to revolt against the Persians. Between the second and third revolts, in the fifth century before Christ, a traveler came to Egypt, notebook in hand, for he was an author, anxious to collect material for his History of the Persian Wars. This was Herodotus, the Father of History, who set down in a pleasant, chatty way his impressions of the wonderful country, of the Nile in flood, of the pyramids, and other great buildings. Much of this interesting book we can read to-day, though Herodotus laid down his pen more than 2,000 years ago.

The Persians, in their turn, were driven out by the world-conqueror, Alexander the Great, of Greece. His stay was but short in Egypt; but his brilliant passage has left marks for all time. He flashed across the desert to worship at the shrine of the god Jupiter Ammon, whom he claimed as an ancestor, and he planned and founded the great city of Alexandria, called after him, which, under his successors, became one of the most important cities in the world.

Three centuries before Alexandria an Egyptian king had employed Greek soldiers and allowed Greek traders to settle in the Delta. Before this, Egypt had been closed to foreigners, much as China was till lately; but these Greeks found their way into the country, and, little by little, their cleverness in trade, their wonderful power in art and in learning, spread Greek influence ever farther along the Nile. Naucrates became a famous Greek city during this time, and to-day explorers find much Greek treasure of all kinds buried in various parts of the Nile delta.

The kings who succeeded Alexander were the Ptolemies, the first of the name being one of Alexander's generals. They were great builders and restorers, and to them we owe the Temple of Edfu, and the temples on the Island

This picture, drawn by Egyptians thousands of years ago, shows an Egyptian catching birds from a boat, while his little child holds his leg for fear of falling into the water. The mother is gathering lotus flowers.

of Philæ, near the great dam at Assuan. The Ptolemies also favored the city, named Alexandria after the founder of their fortunes, and started in it the immense library, afterwards unhappily burned, also the university, to which came some of the most famous Greek scholars. Another Ptolemy built the tall lighthouse, said to be three times as high as the Monument in London, and, like the pyramids, one of the wonders of the ancient world. The flare from its top guided the shipping of Alexandria safely into its double harbor for long years, but not a trace of it now remains. The same Ptolemy caused the Old Testament, originally written in the Hebrew language, and understood only by comparatively few people, to be translated at Alexandria into Greek, the beautiful language which was soon to be carried over the known world, and become the language of scholars everywhere. Another good work of this same king was to cause an Egyptian scribe named Manetho, who knew Greek well, to write in that language a history of Egypt and its religion, and though his actual records have been lost, other writers have copied from Manetho, and thus the lists of kings and other particulars he so carefully compiled have been of great use.

The sloping gallery of the Great Pyramid, leading to the chamber where a Pharaoh was buried.

The Rosetta stone was set up in the reign of Ptolemy V. We see now how it was that a Greek translation came to be put below Egyptian writing. Both languages were then in use in Egypt. And all the time that Egypt was becoming more and more Greek, "a shadow ever lengthening towards the East" was slowly creeping onwards from Rome; it passed over Greece itself in the middle of the second century before Christ, and reached Egypt about a hundred years later.

It is a sad and absorbing story how the end of the independent kingdom came, and how it passed into a Roman province. Shakespeare has founded one of his great plays upon it, the play of "Antony and Cleopatra." The beautiful Cleopatra was the last great ruler of the line of Ptolemies, and, sooner than fall into the hands of the invading Romans, she is said to have allowed a deadly serpent to bite her. So when they came to her palace they found her in all her regal splendor—but dead. In Tennyson's words, Cleopatra says:

I died a queen. The Roman soldier found
Me lying dead, my crown around my brows,
A name for ever.

From Menes to Cleopatra, what a perspective of years! Fifty centuries and more before the birth of Christ, 7,000 years ago, all full of work, full of struggle and every kind of human interest, full of happiness and sorrow.

We have but to look at the vast view again, and much of the old life will become so vivid and real to us that we can almost hear the dancing feet of the children at play in the little worn shoes, and the sad wail of mourners carrying the mummy to its hidden tomb.

THE NEXT STORY OF COUNTRIES IS ON PAGE 4957.

A PICTURE OF THE CATTLE OF ANCIENT EGYPT, DRAWN ON A TOMB 3,500 YEARS AGO

FABLES OF ÆSOP THE SLAVE IN FRENCH

The English version of these fables is in the part of our book beginning on page 2953.

LE LOUP ET LE CHEVREAU

UNE chèvre, qui sortait pour chercher de la nourriture, enferma son jeune chevreau à la maison et lui recommenda

de n'ouvrir la porte à personne jusqu'à son retour. Le loup était caché derrière un buisson, et entendit ce qu'elle dit. Aussitôt qu'elle fût partie, il alla frapper à la porte, puis, imitant la voix de la chèvre, il cria au chevreau d'ouvrir la porte. Mais le chevreau qui regardait à travers le trou de la serrure, vit que ce n'était pas sa mère; il cria au loup de s'en aller, en disant que bien qu'il imitât la voix de la chèvre, il avait trop l'apparence d'un loup pour inspirer confiance.

N'ayez jamais confiance en ceux qui prétendent être différents de ce qu'ils sont en réalité.

LE FERMIER ET LA CIGOGNE

UN fermier tendit un filet dans ses champs, un jour, pour attraper les grues et les oies qui venaient manger le grain nouvellement semé. Plusieurs

de ces oiseaux furent pris dans le filet et parmi eux il y avait une cigogne, qui plaida vivement pour sa vie, en disant au fermier qu'elle n'était ni une oie ni une grue, mais une pauvre, inoffensive cigogne; qu'elle n'était pas venue pour voler le grain, mais qu'elle avait simplement accompagné les autres oiseaux.

"Tout cela est peut-être très vrai," répondit le fermier, "mais comme je t'ai prise avec les voleuses, tu dois subir le même chatiment."

Si nous nous associons avec de mauvaises gens, nous devons' nous attendre à en subir les conséquences.

LE CERF SE MIRANT DANS L'EAU

UN cerf, buvant au bord d'un étang, vit son image dans l'eau, comme dans un miroir. Il s'admirait et dit: "Oh! quelle belle paire de cornes je possède! Avec quelle grâce elles s'élèvent au dessus de ma tête et comme elles rendent ma tête belle. Je voudrais que le reste de mon corps fût aussi beau; mais j'ai des pattes si longues, si maigres que j'ai vraiment honte qu'on les voie."

A ce moment, on entendit le bruit de quelques chasseurs et d'une meute. Le cerf effrayé s'enfuit, et bondissant agilement sur ses pattes maigres, il laissa bientôt les hommes et les chiens derrière lui. Puis il s'élança dans un bois pour se cacher, mais à l'entrée du bois, ses cornes furent prises dans des branches et il fut maintenu jusqu'à l'arrivée des chiens qui le tuèrent.

En mourant, il dit: "Oh! que je suis malheureux! Je vois maintenant que les cornes dont j'étais si fier, sont la cause de ma mort, tandis que mes longues jambes minces, que je croyais si laides, auraient seules pu me sauver."

Souvent, les choses que nous préférons ne sont pas les meilleures pour nous, tandis que certaines choses que nous n'aimons pas sont utiles et précieuses.

WHAT THIS STORY TELLS US

WE know the great difference between seeing and perceiving, and we must now consider the memory, without which there could be no real perceiving. It is just because memory makes perceiving and even higher things possible that its importance is so tremendous. If we could not remember, we should be nothing. Without memory there would be no recognizing, there would be no learning, no knowing. We are so accustomed to use this power of memory that, until we think, we cannot realize what we should be without it. We see something coming along a road, far away, and then, after a while, we perceive that it is a human being. Later, by the dress, we can tell that it is a man and not a woman, but who it is we cannot tell. Finally, we find that it is someone we know. Here we see that the memory acts even in the simplest kind of perceiving, and that it is worth while to devote some time to the study of it.

HOW TO REMEMBER

CONTINUED FROM 4750

NOWADAYS, in dealing with such a great question as that of memory, we do not make the absurd mistake of trying to understand our memories without studying every kind of memory wherever we can find it; and the first great discovery we make is that, in some degree or other, memory is a property of every kind of living creature. Formerly it was said that memory was a property of every kind of nerve and nerve-cell, and that is perfectly true, but it is not the whole truth.

During late years men have studied the behavior of humble forms of plants, and of animals so simple and lowly that no nerves or nerve-cells are as yet developed in them. Yet even here, almost at the beginnings of life, long before there is the least shadowy hint of even the simplest kind of brain, we find some proofs of memory.

All living matter is called protoplasm, and it is a fact that memory is a property of all living protoplasm everywhere. No matter how simple creatures are, we find that their behavior can be made to change by changing their surroundings. This means that in some degree they remember; they act differently because something has occurred perhaps three times before, and the fourth time it occurs they do not behave exactly as they did the first time. What it is in living matter, whether of a nerve-cell or of any other kind of cell, that enables it to remember, we cannot say; neither can we say in advanced cases of memory, as when we remember an idea. But even in the humblest cases of memory, as where an animal behaves differently towards light because it is the second time and not the first time it has seen it, we can only guess what happens. The light the first time somehow made some kind of mark, as we might say, in the living cells, and altered them, so that the next time the light came they were different.

It is supposed by many people that living matter never forgets. When we say we forget, what we mean is simply that we cannot recall. But the thing we say we forget is still there in our mind, and when someone names it we recognize it; if we had really forgotten we should not recognize it.

But even where we cannot recall a thing for ourselves, and where we cannot recognize it when it is recalled for us by somebody else, it by no means follows that we have really forgotten. There are many cases on record where a man appears to have utterly forgotten, for instance, certain words of some language

which he learned and spoke when he was a child; he cannot recall them, and they mean nothing to him when they are recalled; but he proves that they are still there in his mind when, perhaps, he is suffering from a very severe illness. His brain is greatly upset, and these words, which he may not have heard or used for fifty years, or more, come from his lips. Very likely they are used without any sense, and he does not know what they mean, but there they are. The brain has not really forgotten them.

THE DIFFERENCE BETWEEN REMEMBERING AND RECALLING

Such cases as these teach us that in all probability living matter does not forget, but, more than that, they show us that what we call memory is very far from being a simple, single thing. In what we call an ordinary act of memory there are three things involved. There is the pure remembrance, with which we have not much more to do than a table has to do with remembering a dent made in it; there is the recognizing of what we remember: and there is the power of *recalling*. Everyone who has been asked at an examination, "What is this?" and who knows perfectly well that he has seen it a hundred times before, but cannot put a name to it, knows that memory is not such a simple thing as we sometimes suppose.

But in every act of memory the beginning of it is the making of an impression on the brain. No doubt this is a very different thing from making a dent on a table, but we do no harm if we think of it as if it were something like that; and, indeed, the only word which we can use to describe it, such as the word *impression*, which just means "pressing in," suggests a comparison of this kind. Now, as this is the beginning of all memory, and as memory is the beginning of everything that makes us human, it is very important for us to know how far and in what way we can improve this power of ours.

WHEN THE POWER OF THE MEMORY IS AT ITS BEST

We shall make nothing but mistakes unless we learn, first, to distinguish this part of memory from the other parts; and, secondly, to discover any natural changes in this power during the time that we grow from childhood to age. It is very likely that, on the whole, memory is at its greatest when we are young, and tends to diminish steadily as we grow old. There is an apparent exception to this, because at certain ages boys and girls seem to be able to learn poetry and many other things by heart with greater ease than they could have done a year or two before. But this is because the brain is, as it were, just being finished in its making. It is likely, on the whole, that after that the power of being impressed steadily diminishes.

This explains to us some facts about memory which seem peculiar. For instance, we know that, in a general way, we are more likely to remember things that have recently happened than things that happened long ago. This is probably only because the things that happened long ago are lower down in the mind, so to speak, and have been overlaid by many newer things.

WHY OLD PEOPLE REMEMBER BEST THE THINGS OF LONG AGO

Now, we often find that old people, instead of remembering the latest things best, remember them very badly; but, though they are doubtful about recent events, they remember quite clearly something that happened perhaps many years before. The explanation is that the newer impression was made on a brain that was losing its power of being impressed, but the older one was made on a young and very impressionable brain; and the passage of time has not destroyed the deep impressions made in youth.

When we compare different people, we find that there are differences between them in this quality of memory. It is supposed by nearly everybody that education accounts for these differences, and makes them. So one of the great objects of education is to "train the memory." But, if by training the memory we mean making the brain more impressionable than it is by nature, nothing can be more certain than that this was never yet done by any kind of education, and never will be.

To begin with, these differences between people are natural. The amount that a man remembers will, of course, depend upon the amount that he has tried to remember, and so his education is immensely important, because it

largely means giving us opportunities for remembering. But that is an absolutely different thing from any effect in actually improving the power to remember, so far as this first part of memory is concerned.

THE ONLY EXCUSE FOR LEARNING A THING BY HEART

The differences between people in this respect are enormous, but they are natural differences, and we simply have to accept them as they are. Of course, they make a tremendous difference in our lives, because we have seen that memory is the basis of everything else; and though different kinds of memory are needed for different people—as, for instance, the painter, the engineer, and the musician—yet these differences in memory are the beginnings, at any rate, of the differences in what the people achieve.

It is quite certain, then, that the brain's natural power of being impressed cannot be increased by any of the methods which have been too long adopted for that purpose. There may be a good reason for learning by heart, simply because there are things which it is well to have in the mind, and which can be made to stick by repetition. But no kind of learning by heart increases the brain's power of retaining things. Learning by heart does not train the memory; it very often disgusts the mind and disheartens it from thinking.

The only possible defence for learning anything by heart is that the thing is worth knowing. There are plenty of such things, and the time will come when we shall carefully take children at just those ages when learning by heart is easiest, and deliberately use those years to put into their minds the best possible selection we can make of the things which everyone ought to know.

THE THINGS THAT WE MUST KNOW AND THE THINGS THAT WE SHOULD KNOW

There are things that people must know, and there are things that they should know, if possible. The number of these things is a million times greater than could be remembered by the wisest and most learned man that ever lived. We must therefore do our best for each child, and that best will mean the careful selection of the things it should learn and the using of the time when remembering is easiest. We must break up and vary the lessons so as to avoid fatigue, because when fatigue begins, memory ends. Though education cannot improve the natural memory, yet there are certain things which education, in the widest sense of the word, can do or fail to do. Whatever the brain is meant to be by nature, and whatever is in its power to become, yet the building and the health of its cells and nerves, and therefore the success of their duties, depend upon the supply of blood they receive, and upon their never being subjected to over-use.

What we call education, which is sometimes just the opposite of real education, very often means that we injure the brain and spoil the memory at the very time when we think we are training it. School hours are often too long; no child should attend to one thing for so long as an hour, or anything like it. Light, and especially air, may be defective. Foul air means foul blood, everywhere and always; and foul blood means that the brain also is being fouled and poisoned.

A HEALTHY OUTDOOR LIFE IS THE BEST AID TO MEMORY

Our great business, therefore, in taking care of our memories when we are young, is to lead healthy lives as much in the open air as possible; and no doubt we shall find that, in after years, for every one thing we remember that happened indoors when we were children, we shall remember two things that happened out-of-doors.

Now, we must study the laws of the mind as far as possible, in order to see whether there are any laws which will help us to get the most into the mind with the least trouble. We know that the memory is at its best in youth, so that on this account, if for no other reason, youth is the time to learn; and we have also noticed that, as a rule, for each boy and girl there comes at some time or other a period of a few years during which learning by heart is particularly easy. Many grown-up people of to-day are grateful to those who taught them, at this age, such things as parts of the Bible and good poetry, which are precious possessions of their minds for the rest of their lives.

Next we have to consider the various special methods of impressing the memory. The first of these is the

method of repetition. We all know that repetition helps us to remember, and, indeed, this method of going over a thing again and again is the one which has been most believed in since teaching began. This applies equally to our learning-memory and our doing-memory, as we recognize when we say that practice makes perfect. Now, so long as we clearly understand that repetition and learning by heart do no good to the memory itself, but merely help to impress it, we are quite right to use this method, and there are certain things well worth noticing.

THE BEST WAY OF REMEMBERING WHAT WE HAVE HEARD

One of the great methods of learning is to listen to something spoken and take notes of it. Now, in such cases we notice that the two processes of listening and writing down, and of reading over, result in much better remembering if they are close together. If we read our notes the same day as we take them down, we shall remember more a month hence than if we go over them a few days later. When the repetition comes close on the first impression, it is as if the iron were made hot by the first impression, and the second impression is more effective than if we wait for the first to cool.

Another most important fact is that one kind of repetition is very different from another, and this is one of the mistakes that almost all of us make. We may hear without "taking a thing in"; we may read or write a thing, or we may repeat it out loud, while our attention is somewhere else. In such cases all our labor is wasted, as certainly wasted for remembering the thing as it is wasted for "training the memory." It is no use trying to learn when we are tired because the lesson has gone on too long, or when we are feeling cold or thirsty or hungry.

WHY READING HELPS US TO REMEMBER BETTER THAN WRITING

When we are really ill, it is not possible to attend or, as we say, take a thing in. One thing is certain, and it has been proved in every possible way a million times—that repetition without attention is useless. It is very probably worse than useless, for it makes the brain less able to attend on other occasions, even apart from the waste of time. It is worth noting that intelligent, careful, attentive reading of anything is a more effective kind of repetition than copying it out, though we should not suppose so. In copying out, as a rule, too much of our attention is devoted to the mechanical part of what we are doing, and so we are not really attending so well, though we seem to be working harder.

The secret of mere remembering lies, on the whole, more in attention than in anything else. It is most difficult to find out exactly what attention is, and exactly what happens when we attend. The difference between attending and not attending is probably that, when we are not attending, the disturbances that reach the brain from the outside world are scattered in all sorts of directions throughout the brain. The effects of them are almost wasted, because they scarcely go anywhere in particular; and it may be also that perhaps the most important parts of the brain, when we are not attending, are really not in action at all, so that the results of what is going on never reach them.

THE BAD EFFECT UPON THE MEMORY OF CONSTANTLY REPEATING A THING

But when we attend it is probable not only that the highest parts of the brain are in action, but also that everything is carefully arranged and ordered, so that what comes into the brain shall take a definite path, reach a definite place, and do definite things there. It is worth noticing that repetition tends to take the edge off attention, and that is one of the objections to it. As a rule, the more we repeat, the less we attend, and therefore the less result do we get.

If attention is the secret of memory, we must find out, if possible, what is the secret of attention. Repetition, we know, is certainly not the secret. The real secret of attention is interest, and so interest is the real key to successful remembering. When we are interested and attend, the eye is sensitive, the ear strains to hear, and the rest of the body is kept perfectly still, so that nothing shall interfere with our hearing or seeing, and thus the impression is more vivid. We all know that this is the case by our own experience, for when we have been listening to an interesting lecture, our whole mind has been alert, and we have remembered what we heard.

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THE SILENT PRINCESS

CONTINUED FROM 4787

A CERTAIN king who had twelve sons was so eager to have a daughter that he consented to slay every one of the young princes if only he might have a daughter sent him in their stead.

When the queen heard of this bargain which her husband had made with the King of the Dwarfs she wept bitterly, and declared that no daughter could make up to her for the loss of her handsome sons.

The youngest son, finding his mother in tears one day, inquired what grieved her.

"Alas!" she answered, "the king, your father, has bartered your lives for the sake of a baby girl who will shortly be born. On the day she arrives you are all to be put to death."

"Do not weep," replied the young man. "We will go away and hide so that our father's threat may not be fulfilled."

Before long the baby princess was born, and so fair and sweet was she that she quickly won the hearts of all about the court. She was always dressed in white, and on her forehead hung a golden star, as golden as the beautiful hair that fell in silken tresses about her lovely neck and shoulders.

As the years rolled by the lovely girl grew into a beautiful young woman, with whom more than one prince fell deeply in love. But she would listen to none of them, and was as happy as the day was long until by chance she learned the story of the fate of her brothers. In an idle mood she had found her way to a disused attic room, and there, at the bottom of an old dusty box, she had come upon twelve little shirts. Carrying them to her mother, she asked to whom they belonged. "They are much too small to fit my father," she said.

At this the queen burst into tears, and related the whole of the sad story.

"Oh, how cruel!" exclaimed the princess when she knew all the story. "But do not weep. I, who have been the cause of so much sorrow, will go in search of my poor brothers."

So, with the twelve little shirts in her hands, she set out. For a whole day she traveled through the woods, and at dusk she met a young man who stood amazed to see so lovely a maiden unattended in such a place. He asked if he could help her, and thereupon the princess explained that she was seeking her brothers, who many years before had been compelled to take refuge in the woods.

"I know not even if they be still alive," she said; "but it was for my sake that they left their home, and I am seeking them in the hope that I may be able to make their exile a little less lonely. See, here are the small shirts which they used to wear when they were very young."

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As soon as his eyes fell upon the shirts the young prince recognized them.

"My dear little sister," he cried, embracing her, "you are indeed our deliverer!" And, taking her hand, he led her to a little wooden hut, very empty of all save the barest necessities.

By-and-by the other brothers returned, and they, too, welcomed their sister gladly. But one day, as they all sat by the fire, the princess noticed twelve tall lilies growing together in the garden, and she ran out and plucked them, meaning to give one to each of them. But the flowers were magic flowers, and as she picked them the twelve brothers changed, one by one, into great blackbirds, which flew off without a sound into the forest. At the same moment the little house disappeared, and the princess found herself alone in the midst of the wild woods.

Instead of giving way to despair, however, she bravely set out to find a path, but before she had gone far she came upon the cruel King of the Dwarfs.

"Is there no way by which I can rescue my brothers?" she asked.

"There is only one way by which you can break the spell," answered the dwarf; "and that is by remaining dumb for seven years."

Terrible as this condition was, the princess was determined to carry it out. So she found a high tree, and seated herself in one of the branches. But that very afternoon the king of that country rode by, and as he passed the foot of the tree he looked up, and instantly fell in love with the beautiful maiden with the golden star upon her forehead.

"Will you be my bride?" asked the king in a soft voice.

The princess gently nodded her head; but not a word did she utter. So the king, greatly astonished, lifted her down, set her on his horse, and carried her away to his palace. Here they were married in great state, and they lived together for six happy years.

Now, the king had a mother, who was terribly jealous of the young girl, and was wicked enough and cruel enough to invent all sorts of untrue stories about her.

For a long time the king had refused to believe any ill of his gentle lady; but the old queen so persisted in her stories that he at last begged his wife to speak, if only one word, to deny them. But still she kept silence, until even the king himself began to doubt her innocence, and the day came when he consented to have her put to death.

A great fire was kindled in the courtyard of the palace, and the innocent young queen, tied hand and foot, was waiting to be thrown to the flames, when suddenly the sky darkened, and, to everybody's amazement, twelve great blackbirds flew down. At that very moment the seven years expired, and the blackbirds changed into twelve handsome young men, who had come to release their sister.

The happy queen, who was now free to speak, ran to the palace, where the king sat alone in his grief, and related all that had taken place. The king was overjoyed at her news, and, embracing her, begged her forgiveness.

Great rejoicings took place at the palace that night. The old queen was instantly banished from the kingdom, and the young queen, with her husband and her twelve handsome brothers, lived happily together all their lives.

THE CUNNING FARMER AND THE DWARF

A FARMER, whose land included a little hill, decided that this should not lie idle, and so began to plough it up. Immediately a dwarf who lived in the hill came out and angrily asked how the farmer dared to plough on the roof of his house, and disturb his rest. The farmer apologized very humbly, and then suggested that it was to the interest of both of them that the hill should be ploughed, and crops grown.

At first the dwarf would not agree, but the farmer did his best to persuade the little man. He offered to do all the work himself, if the dwarf would agree that the first year the farmer should have what grew above the ground, while the dwarf had all below the ground, and the second year the farmer should have what was below and the dwarf that which was above.

The dwarf was quite willing to fall in with this arrangement; but the cunning farmer planted corn the first year, and left the roots for the dwarf, while he took the grain, and in the second year he planted carrots, and left the tops for the dwarf, while he took the roots.

HOW RIP VAN WINKLE WENT HOME

AS Rip Van Winkle approached the village after his long sleep, about which we read on page 4779, he met a number of people, but none whom he knew, which somewhat surprised him. Their dress, too, was of a different fashion from that to which he was accustomed. They all stared at him with equal marks of surprise, and whenever they cast their eyes upon him invariably stroked their chins. The constant recurrence of this gesture induced Rip involuntarily to do the same, when, to his astonishment, he found his beard had grown a foot long!

He had now entered the outskirts of the village. A troop of strange children ran at his heels, hooting after him and pointing at his grey beard. The very village was altered; it was larger and more populous. There were rows of houses which he had never seen before, and those which had been his familiar haunts had disappeared. Strange names were over the doors, strange faces at the windows—everything was strange.

His mind was now troubled; he began to doubt whether both he and the world around him were not bewitched. Surely this was his native village, which he had left but the day before. There stood the Catskill Mountains; there ran the silvery Hudson at a distance; there was every hill and dale precisely as it had always been.

Rip was sorely perplexed. "That flagon last night," thought he, "has addled my poor head sadly!"

It was with some difficulty that he found the way to his own house, which he approached with silent awe, expecting every moment to hear the shrill voice of Dame Van Winkle. He found the house gone to decay—the roof fallen in, the windows shattered, and the doors off the hinges. A half-starved dog that looked like Wolf was skulking about it. Rip called him by name, but the dog snarled, showed his teeth, and passed on. This was an unkind cut indeed. "My very dog," sighed poor Rip, "has forgotten me!"

He entered the house, which, to tell the truth, Dame Van Winkle had always kept in neat order. It was empty, forlorn, and apparently abandoned. The desolateness overcame all his fears; he called loudly for his wife and children; the lonely chambers rang for a moment with his voice, and then all again was silence.

He now hurried forth and hastened to his old resort, the village inn, but it, too, was gone. A large rickety wooden building stood in its place, with great gaping windows, some of them broken, and mended with old hats and petticoats, and over the door was painted: "The Union Hotel, by Jonathan Doolittle." Instead of the great tree that used to shelter the quiet little Dutch inn of old, there was now reared a tall, naked pole, with something on the top that looked like a red nightcap, and from it was fluttering a flag, on which was a singular assemblage of stars and stripes.

All this was strange and incomprehensible. He recognized on the sign, however, the ruby face of King George, under which he had smoked so many a peaceful pipe; but even this was singularly altered. The red coat was changed for one of blue and bluff, a sword was held in the hand instead of a sceptre, the head was decorated with a cocked hat, and underneath was painted in large characters: "GENERAL WASHINGTON."

There was, as usual, a crowd of folk about the door, but none that Rip recollected. The very character of the people seemed changed. There was a busy, bustling tone about it, instead of the accustomed drowsy tranquillity.

Rip looked in vain for the sage Nicholas Vedder, with his broad face, double chin, and long pipe, issuing clouds of tobacco-smoke instead of idle speeches; or Van Bummel, the schoolmaster, doling forth the contents of an ancient newspaper. In place of these a lean, pale-looking fellow, with his pockets full of handbills, was talking vehemently about the rights of citizens, elections, members of Congress, liberty, Bunker's Hill, heroes of seventy-six, and other words which were a perfect puzzle to the bewildered Van Winkle.

The appearance of Rip, with his long, grizzled beard, his rusty weapon, his uncouth dress, and an army of women and children at his heels, soon attracted the attention of the tavern politicians.

They crowded round him, eyeing him from head to foot with great curiosity. The orator bustled up to him, and, drawing him partly aside, inquired on which side he voted. Rip stared in vacant stupidity. Another short but busy little fellow pulled him by the arm, and, rising on tiptoe, inquired in his ear whether he was Federal or Democrat.

Rip was equally at a loss to comprehend the question, when a knowing, self-important old gentleman made his way through the crowd, pushing them to the right and left with his elbows as he passed, and planting himself before Van Winkle, with one hand on his side, the other resting on his cane, his keen eyes penetrating, as it were, into Rip's very soul, demanded, in an austere tone, what brought him to the election with a gun on his shoulder and a mob at his heels, and whether he meant to breed a riot in the village.

"Alas, gentlemen," cried Rip, somewhat dismayed, "I am a poor, quiet man, a native of the place, and a loyal subject of the king, God bless him!"

Here a general shout burst from the bystanders: "A Tory! A Tory! A spy! A refugee! Away with him!" It was with great difficulty that the self-important man restored order; and, having assumed a greater austerity of brow, demanded again of the unknown culprit what he came there for, and whom he was seeking. The poor man humbly assured him that he meant no harm, but merely came there in search of some of his neighbors who used to keep about the tavern.

"Well, who are they? Name them."

Rip bethought himself a moment, and inquired:

"Where's Nicholas Vedder?"

There was a silence for a little while, when an old man replied in a thin, piping voice:

"Nicholas Vedder! Why, he is dead and gone these eighteen years! There was a wooden tombstone in the churchyard that used to tell all about him, but that's rotten, and gone, too."

A TROOP OF CHILDREN RAN AT HIS HEELS, HOOTING AFTER HIM AND POINTING AT HIS BEARD

"Where's Brom Dutcher?'

"Oh, he went off to the army in the beginning of the war! Some say he was killed at the storming of Stony Point; others say he was drowned in a squall at the foot of Antony's Nose. I don't know—he never came back again."

"Where's Van Bummel, the schoolmaster?"

"He went off to the wars, too—was a great militia general, and is now in Congress."

Rip was grieved to hear of these sad changes and grieved to find himself so much alone in the world. Every answer puzzled him, too, by treating of such enormous lapses of time, and of matters

which he could not understand—war, Congress, Stony Point. He had no courage to ask after any more friends, but cried out in despair:

"Does nobody here know Rip Van Winkle?"

"Oh, Rip Van Winkle!" exclaimed two or three. "Oh, to be sure, that's Rip Van Winkle yonder, leaning against the tree."

Rip looked, and beheld a precise counterpart of himself as he went up the mountain—apparently as lazy, and certainly as ragged. The poor fellow was now completely confounded. He doubted his own identity, and whether he was himself or another man. In the midst of his bewilderment the self-important man demanded who he was, and what was his name.

"Goodness knows!" exclaimed he, at his wits' end. "I'm not myself—I'm somebody else—that's me yonder—no, that's somebody else got into my shoes. I was myself last night, but I fell asleep on the mountain, and they've changed my gun, and everything's changed, and I'm changed, and I can't tell what my name is or who I am!"

The bystanders now began to look at each other, nod, wink significantly, and tap their fingers against their foreheads. There was a whisper also about securing the gun, and keeping the old fellow from doing mischief, at the very suggestion of which the self-important man retired with some precipitation. At this critical moment a fresh, comely woman pressed through the throng to get a peep at the grey-bearded man. She had a chubby child in her arms, which, frightened at his looks, began to cry.

"Hush, Rip," cried she, "hush, you little dear; the old man won't hurt you."

The name of the child, the air of the mother, the tone of her voice, all awakened a train of recollections in his mind.

"What is your name, my good woman?" asked he.

"Judith Gardenier."

"And your father's name?"

"Ah, poor man, Rip Van Winkle was his name, but it's twenty years since he went away from home with his gun, and never has been heard of since. His dog came home without him; but whether he shot himself, or was carried away by the Indians, nobody can tell. I was then but a little girl."

Rip had but one question more to ask; but he put it with a faltering voice:

"Where's your mother?"

"Oh, she died but a very short time since; she broke a blood-vessel in a fit of passion at a New England pedler."

There was a drop of comfort, at least, in this intelligence. The honest man could contain himself no longer. He caught his daughter and her child in his arms and kissed them again and again.

"I am your father!" cried he. "Young Rip Van Winkle once—old

"ALAS, GENTLEMEN," CRIED RIP VAN WINKLE, "I AM A POOR MAN, A NATIVE OF THE PLACE"

RIP MADE FRIENDS AMONG THE RISING GENERATION, WITH WHOM HE GREW INTO FAVOR

Rip Van Winkle now! Does nobody know poor Rip Van Winkle?"

All stood amazed, until an old woman, tottering out from among the crowd, put her hand to her brow, and, peering under it in his face for a moment, exclaimed:

"Sure enough, it is Rip Van Winkle; it is himself! Welcome home again, old neighbor! Why, where have you been these twenty long years?"

Rip's story was soon told, for the whole twenty years had been to him but as one night. The neighbors stared when they heard it; some were seen to wink at each other, and put their tongues in their cheeks.

It was determined, however, to take the opinion of old Peter Vanderdonk on the matter, who was seen slowly advancing up the road. He was a descendant of the historian of that name, who wrote one of the earliest accounts of the province.

Peter was the most ancient inhabitant of the village, and well versed in all the wonderful events and traditions of the neighborhood. He recollected Rip at once, and corroborated his story in the most satisfactory manner. He assured the company that it was a fact, handed down from his ancestor the historian, that the Catskill Mountains had always been haunted by strange beings; that it was affirmed that the great Henry Hudson, the first discoverer of the river and country, kept a kind of vigil there every twenty years, with his crew of the ship Half-moon, being permitted in this way to revisit the scenes of his enterprize, and keep a guardian eye upon the river and the great city called by his name; and that his father had once seen them in their old Dutch dresses playing at ninepins in a hollow of the mountain.

To make a long story short, the company broke up and returned to the more important concerns of the election. Rip's daughter took him home to live with her. She had a snug, well-furnished house, and a stout, cheery farmer for her husband, whom Rip recollected for one of the urchins that used to climb upon his back. As to Rip's son and heir, who was the image of himself, seen leaning against the tree, he was employed to work on the farm, but before long there were signs of a hereditary disposition to attend to anything else but his business.

Rip now resumed his old walks and habits. He soon found many of his former cronies, though all rather the worse for the wear and tear of time, and preferred making friends among the rising generation, with whom he soon grew into great favor.

Having nothing to do at home, and being arrived at that happy age when a man can be idle with impunity, he took his place once more on the bench at the inn door, and was reverenced as one of the patriarchs of the village, and a chronicle of the old times "before the war."

He used to tell his story to every stranger that arrived at Mr. Doolittle's hotel; the old Dutch inhabitants almost universally gave it full credit.

THE DOG THAT CAME HOME AGAIN

MOUSTAPHA was small, he was lame, he was a just a tramp dog. He looked as though he had not a friend in the world. His right eye had been dreadfully damaged. His dirty wooly coat was growing grey at the ends, as if aged by the sorrows and miseries of life. He was a mongrel. You might take your choice between a terrier, a griffon, a poodle—anything. He was a freak.

Moustapha was a little dog that lived in Havre, and M. Adolphe Destroyes, a French writer, tells this charming story about him.

One night a young fellow, named Robert, who had been drinking heavily, was stumbling home through the dark streets to his lodging, when he caught sight of poor Moustapha shivering in a place of shelter. Robert was kind-hearted even when he was drinking; he stooped down, picked up the poor, forlorn dog, and carried him home to his attic. There he washed the dog's wound and bound it up with a piece of rag. Moustapha cowered and crouched before him; he did not dare even to lick the hand that tended him.

ROBERT CARESSED THE POOR DOG

On the following morning, when Robert woke up from his heavy sleep, he was surprised to see a dog in his room—a dog with a bandaged head, whose eyes were set anxiously upon his face as though hoping for a welcome. Robert recalled everything. He got up, and opened the door to send the dog away. At this Moustapha looked up at him in mute pathetic appeal, and wore such an air of helplessness that Robert's heart was touched; he gave the little dog a gentle pat, and no longer disturbed himself about so trifling a matter.

In this way a strange companionship grew up between the man and dog which lasted for two years. Between the young man and the shabby mongrel there seemed little in common; but the man consented to be loved, and the pair were really united. Moustapha's affection was always wise and discreet. He kept a proper distance, with watchful eyes. He never demanded, invited, or even begged a little patting. He was never tiresome.

When this companionship had lasted for two years, the dog fell suddenly sick with the mange. Robert was sorry for the animal but did not wish to be bothered with a sick dog. As there was no dog's hospital in Havre, he decided to drown Moustapha.

Robert waited for a dark evening, and walked with the poor, sick dog to the end of the pier. The sea was rough; there was no moon. The waves, which were full of greenish reflections, whitened as they broke against the wall.

Robert fastened a stone to a noose, picked up the dog roughly, tied the stone to the poor little animal's neck, and then flung him down into the sea. Moustapha uttered neither whine nor whimper. Nothing whatever was heard except the sound of the little body striking against the rough water. The young man, feeling a little ashamed of himself, leaned over to look. As he did so, a gust of wind swept his cap away. It was a cap embroidered by someone whom he loved. He looked anxiously in the water for his cap, saw nothing there but the foaming crests of the waves, and at last made his way home, miserable and dejected on account of this loss he had sustained.

He had been an hour in bed when he heard a scratching at his door. He jumped up and went to open it.

Moustapha stood on the threshold, with the cap between his teeth.

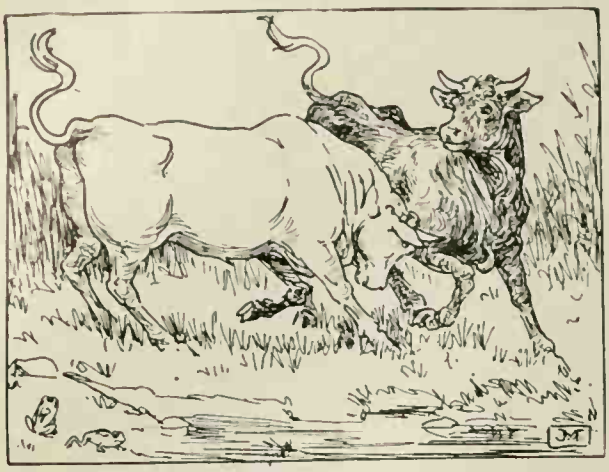
The poor dog was stained with blood; the water, trickling from his hair in strange colors, mingled with this blood and fell upon the stones. Robert knelt down and caressed the poor dog, with tears in his eyes.

Moustapha regarded his master for the last time in a very pitiful manner, uttered a little sighing cry, and died.

THE FABLES OF ÆSOP THE SLAVE

THE FROGS AND THE BULLS

A FROG one day, sitting at the edge of a pond, saw two bulls fighting in a meadow. He cried out to a companion:



"Look at that dreadful fight! What will become of us?"

"Do not let them frighten you," replied the other. "How can their quarrels affect us? They are quite different from us in every way."

"Perhaps," said the first frog, "their life is different from ours; but, as one of them will certainly get the better of the other, he who is beaten will take refuge here in the marshes, and perhaps tread on some of us. You see, therefore, we are more concerned with their quarrel than you think."

When the rich quarrel, the poor are usually the greatest sufferers.

THE GODDESS AND THE TREE

ONCE upon a time the gods agreed each to select a tree, and to guard and watch over it. Jupiter chose the oak,

Venus the myrtle, Hercules the poplar, and the others each chose a tree. Pallas, who was present, selected the olive.

"The olive shall be my tree," she said, "and my reason for choosing it is that it bears plenty of useful fruit. All the trees that you have chosen bear nothing."

Jupiter replied to her:

"Now I see that it is not without justice that you are celebrated for your wisdom, for unless there is some benefit in the things that you do, it is foolish to do them for vainglory."

Let all your actions be wise and useful.

THE LION IN LOVE

A LION one day was passing the house of a forester, when he saw there a beautiful girl, with whom he fell in love. So great was the love of the lion for her that he sought out the forester, her father, and said to him:

"I am deeply in love with your daughter. Will you give me her hand in marriage?"

The forester was astonished at such a strange request, and was at first inclined to refuse the offer of the lion. Recollecting, however, the strength of the king of beasts, and being afraid of his wrath, he replied:

"Sir Lion, I will give my consent on two conditions. These are that you have your teeth drawn out and your claws cut, for my daughter is very young and very timid, and would certainly be frightened at them."

The lion was too deeply in love to hesitate and he willingly agreed to the forester's wishes. No sooner was he deprived of his teeth and claws, however, than the forester saw that he was harmless, and attacked and killed him.

Those who commit rash actions may live to regret them all their lives.

THE STAG IN THE OX-STALL

A STAG, being hard pressed by hounds, took refuge in an ox-stall. One of the oxen asked him why he had fled into such a place, where he was sure to be killed.

"Ah," said the stag, "if you will let me conceal myself I will be off again at the first opportunity!"

The oxen agreed, and the stag stayed there until evening approached. Many of the farm laborers came in with bundles of fodder, but did not see him. The stag started to thank the oxen, but one of them said:

"We should all be glad to help you escape; but our master has not yet been here, and nothing escapes his eyes."

Shortly after the farmer himself came to look at his men and feed the cattle. He happened to look down, and saw the stag's horns sticking out of the

straw. He immediately raised a hue-and-cry, and killed the poor stag.

Nobody looks after a man's affairs so well as he does himself.

THE CAT, THE EAGLE, AND THE SOW

HIGH among the branches of an old oak-tree an eagle was rearing her young. A cat and her kittens lived in a hole in the middle, and a sow with her little pigs sheltered in a hollow at the bottom of the tree. One day the cat climbed up to the eagle and said:

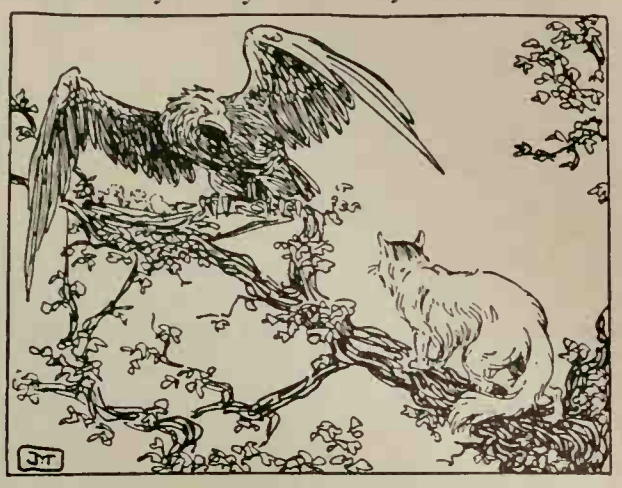
"My good neighbor, we are in great danger. That dirty sow below is digging at the roots of this tree so that she can overthrow it and get at our young ones. You must do as you please, but I, for my part, intend to stay at home and watch what she does."

The eagle was much frightened, and the cat then left her and visited the sow.

"I hope, neighbor," she said, "that you do not intend to go abroad to-day."

"Why not?" asked the sow.

"Oh," replied the sly cat, "I overheard the eagle promise her young a fine fat little pig for dinner the first time she saw you go out! I must hurry home, for she may fancy one of my kittens."



From that time the cat always went out for food by night, so that the eagle and the sow should think that she kept careful watch. Accordingly, they, too, kept at home. The result was that their young were all starved, and became a prey to the cat and her kittens.

Beware of mischief-makers.

THE MAN AND HIS NEGRO SERVANT

ONE day a man engaged a negro servant. It was the first time that he had ever seen one, and he thought that the black color of his skin was due to his failure to keep himself clean.

"Put him into a tub," he said to his other servants, "and scrub him well until he is clean and white again."

His servants set to work. They scrubbed and scrubbed, they washed and scoured, but all to no purpose. At last the negro caught a cold and died.

Many people attempt to do quite impossible tasks through ignorance.

WHEN DID YOU LAST SEE YOUR FATHER?

COLONEL SIDNEY was a Royalist colonel, brave, handsome, gay, and so kind that every peasant adored him. To his little son this splendid Cavalier was something like a god.

When his father had to hide from the Roundheads, and his mother expected every moment to have them searching her castle, the little boy knew that he must say nothing of his father's hiding-place. When the Puritans came and searched for Colonel Sidney, the boy knew that they would question him, and that he must save his father. The Puritans gave up the search, and retired to the great hall, to which they summoned the ladies.

The boy listened to the questions and answers, and heard his mother tell a lie to save his father's life. Presently one of the Puritans whispered to another, and one rose and spoke to the chief, who glanced at the handsome boy, and said:

"Yes, it is good counsel; we will question the little lad at once."

The mother was told to stand on one side, and the boy was summoned and came forward to the table. He stood before his judges, upright, strong, and handsome, the image of his father. He appeared quite calm, but his heart was hammering against his ribs, and the palms of his hands were clammy with dread. He had a giant's task on his young soul—not to betray his father, and not to tell a lie.

One of the Puritans, leaning towards him, said, in a slow and menacing voice:

"The Lord God consumes with everlasting fire those who tell falsehoods, and all those will be punished whom the Lord casts away in His indignation and wrath. Now, listen to me—I ask you, in the name of the Lord God,—When did you last see your father?"

The boy replied in a voice that was steady and firm:

"I saw Colonel Sidney last night.'

"Last night!" they exclaimed.

"And he told me," continued the boy fearlessly, "to fear God, and honor the king, and love my country."

"Last night?" cried one of the judges. "Then it was in the castle?"

"Yes."

"What part of the castle?"

"WHEN DID YOU LAST SEE YOUR FATHER?" ASKED THE PURITAN IN A MENACING VOICE

This picture is by W. F. Yeames, R. A., and is published here by permission of the Walker Art Gallery, Liverpool.

"I will show you."

They rose excitedly, and the boy led them to a room with a little bed in it.

"It was here," he said.

"Whose room is this?"

"It is mine."

"And your father came to you here last night?"

"Yes, he did."

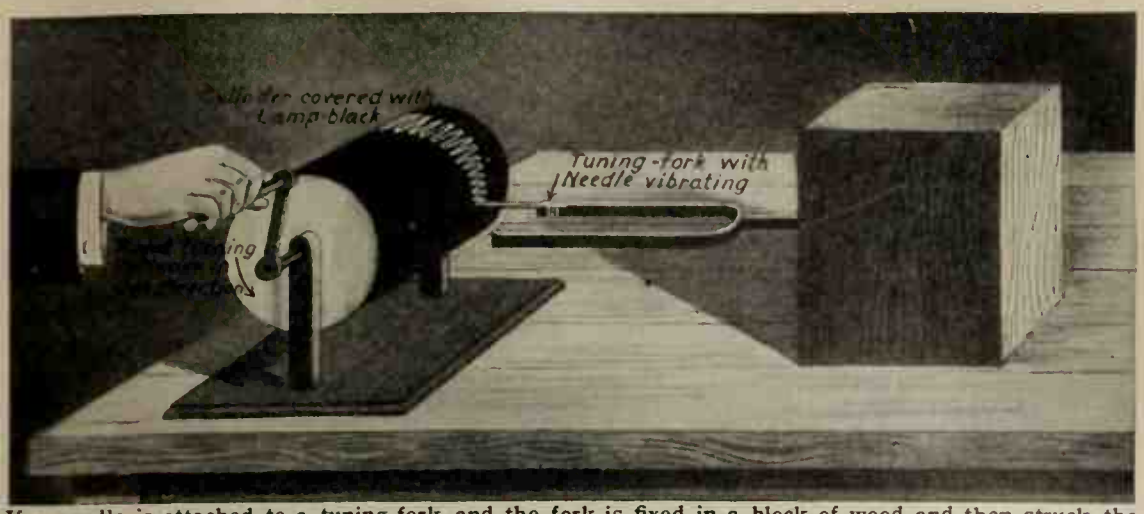
"Where did he go afterwards?"

"I do not know. I was asleep when he came, and I was still sleeping when he went."

"What mean you by that?"

"The last time I saw my father," replied the boy, "was in a dream."

THE NEXT STORIES ARE ON PAGE 4983.



If a needle is attached to a tuning-fork, and the fork is fixed in a block of wood and then struck, the vibrating needle will draw a wavy line upon a cylinder that is made to revolve slowly and evenly.

MUSIC AND NOISE

CONTINUED FROM 4582

WE know that sound waves, just because they are waves, agree in many ways with other kinds of waves, like the waves of the sea or the waves of light. We must now go on to study what exactly is the nature of these sound waves; and the first thing we discover is that they differ from other waves in a very important respect.

In the case of the sea, the wave runs along the surface of the sea, but the movements of the water, which make the wave, are not at all along the surface of the sea; they are up-and-down movements. Of course, it looks to our eyes as if the water were really running along, but it is not: the wave is running along; the water itself is only rising and falling.

The proper way of saying this is that the vibration is at right angles to —or away from—the line of the wave. The wave is moving along in one direction, and the particles of water that make the wave are moving at right angles to that direction. They are moving, not along, but up and down. The movement might just as well be from side to side, but in any case it is a *transverse* vibration — that is to say, an "across" vibration. Now, what we have learned about the waves of the sea is true, as we shall see later, of the waves of light; but it is not true of sound waves. The great point about sound waves is that the movement of the air, or whatever the medium happens to be, is not at right angles to the path of the wave, but is a movement to and fro in the line of the wave. Let us think of a stretched string or gong that is vibrating and giving, so to speak, a little series of blows, or kicks, to the air that is next to it; or let us think of a fist moving backwards and forwards in the air, making a number of quick taps.

That is the way in which a sound wave is started. When the air is kicked, or tapped, it is squeezed; but it is elastic, and in between the kicks, or taps, it springs back, and so it is alternately condensed and expanded, and the wave is made up of these to-and-fro movements of the particles of air in the line of the wave.

One virtue, at any rate, of this kind of wave is that we can readily form a picture of the way in which it travels. This is not so easy if we take a wave of light or a wave in the sea. The drops of water are moving up and down, and yet the wave moves on. It is not easy to see how the wave is made to travel when it consists of

transverse, or across, vibrations. But when it consists of to-and-fro, or longitudinal, vibrations, like a sound wave, it is really not at all difficult to form in our minds an accurate picture of the way in which the wave travels.

A GAME WITH BILLIARD-BALLS THAT TEACHES HOW SOUND WAVES TRAVEL

For an illustration of this, all we need do is to place on a billiard-table a row of billiard-balls, all touching one another. Suppose we now roll another billiard-ball against the ball at one end of the row. Each ball in turn is squeezed, and passes the pressure on to the next one, with the result that the ball at the other end of the row is shot out by itself. Each ball in turn is pressed and relaxed. And that is what happens to the air when a sound wave travels through it, and we may imagine that the wave is made to travel by particles of air bumping against each other in their to-and-fro movement, just as the billiard-balls bump each against the next.

That is all we need know about the nature of sound waves; but the next question which we must naturally ask is: What makes the difference between the kinds of sounds that we call noises and those we call musical notes? Or, in the case of a modern piece of music full of discords, what marks the line between music on the one hand, and din on the other hand?

Well, the case of music teaches us that there is no sharp and absolute line to be drawn between noise and music, as there are many sounds and combinations of sounds which are pleasant and musical to one ear and unpleasant to another. Nevertheless, though there is room for difference of opinion at the margin between the two kinds of sounds, we can answer without hesitation that the difference between what everyone would call a noise on the one hand, and what everyone would call a musical tone on the other, depends on whether the waves making the sound are regular or irregular.

THE SHAPE OF THE MUSICAL SOUNDS OF AN ORCHESTRA

When we take a rich and complicated musical sound made by a large orchestra, the resulting wave is regular and yet irregular. The ear of a child, or any untrained ear, may not perceive the regularity, and to such an ear the sound may be a noise; but the ear of a musician may perceive that the sound really is regular and has a definite shape, and to him it may be a splendid musical experience. Also, there may be room in music sometimes for sounds which are partly regular, and therefore musical, and partly irregular, and therefor noise. Certain of the metal and drum-like instruments which are struck in the modern orchestra owe their value to this mixture of noise and music which they make.

We do not really know why waves which strike the ear in a regular way should be called pleasant any more than we know why those waves which are irregular should be called unpleasant. After all, it seems natural that a regular, even, steady flow of impulses—provided they be not too loud—into the nerve-cells of the hearing part of the brain should be pleasant. Their business is to receive impulses; and the proper exercise of the business, or function, of every living thing, if it be in a perfectly healthy state, is always pleasant.

THE GREAT DIFFERENCE BETWEEN NOISE AND MUSIC

On the other hand, we can imagine why it should be unpleasant for the nerve-cells to be disturbed by waves without order or rhythm, all mixed up together, and, as we may guess, liable to throw out of order—dislocate, so to speak—the living machinery of the nerve-cells.

We may fairly compare the difference between the effects of noise and music to the difference between rocking a baby and shaking it. It is soothing and pleasant to the whole body to be evenly rocked, but it jars and is disagreeable to be unevenly shaken. These two cases are just parallel to what must happen to the nerve-cells. Music rocks and lulls them; but noise shakes and jars them.

It may quite well be that this picture really corresponds to the actual effect—if we could only see it—of the two kinds of sound waves upon the structure of the nerve cells.

We need say little more about noise, because, as it is made by irregular waves, there is nothing definite to study; and, on the other hand, there is a great deal to study when we look at definite, regular waves which make musical

sounds. Perhaps the only other point worth noticing about noise is the very marked power of unexpected noises upon the brain. This effect of noise, in making us jump or start, is doubtless, in its origin, very useful, warning men in a natural mode of life, or the lower animals, of the approach of enemies or of some other kind of danger.

WHY A FAINT NOISE OFTEN CAUSES FEAR WHILE A LOUD NOISE DOES NOT

Nothing is more striking than the noiseless tread of animals which live by hunting others, and whose livelihood depends upon their avoiding this quick and universal influence of noise. The best proof of the fact that the powerful influence of noise on the brain depends almost entirely upon its warning character is that if we know the noise is coming—as, for instance, if we make it ourselves—the effect upon our minds is wholly different.

The sudden voice even of a loved person, the sudden opening of a door when one is playing the piano, may cause a violent start; yet the person who is thus startled—because noise is meant to startle, so to speak—may walk without concern through a boiler factory or supervize the firing of a great gun. We all know the difference between slamming a door ourselves and hearing someone else slam it. The key to all this, as to so many other facts of human behavior, is to be found when we try to find a *use* for our tendencies. It is, in general, useful to be startled by noise; but it is not useful to be startled by a noise of which we know the meaning, and which we have already allowed for. Hence the difference between our conduct in the two cases.

And now we must turn to the study of musical notes. The most simple, but by no means the most interesting, difference between musical notes is in their loudness; and what has to be said about this is true equally of noises.

THE LOUDNESS OF A SOUND DEPENDS UPON THE SIZE OF THE SOUND WAVES

Loudness of sound depends upon the size of the waves that cause it. The proper word always employed in this connection is not size, but *amplitude*. The greater the amplitude of the waves, the louder the sound. If sound waves were like water waves, then a very faint sound would correspond to a little ripple, and a very loud sound to waves "mountains high." There is something to be added to this, however, because when we use such a word as loudness, it is quite evident that we have to reckon not only with what is outside the ear, but also with the ear itself. Now, it is the fact that if we take notes of various pitch, high and low, all having exactly the same size, or amplitude, of waves, they do not sound equally loud. Thus, though it is perfectly true that the loudness of a given note depends on its amplitude, when we compare different notes we find that if amplitude be all the same, the higher in pitch they are, the louder they sound. In other words, our ears are more sensitive to high notes than to low notes.

From the point of view of music this is extremely important. It means that when we are listening to voices singing together or to something played on the piano, our ears always give more value to the higher notes than to the lower ones.

WHY HIGH NOTES ARE ALWAYS HEARD BETTER THAN LOW NOTES

The basses, tenors, and contraltos, for instance, may be making just as much sound really as the sopranos; but our ears being more sensitive to high tones, we hear the sopranos best. That is why the sopranos are usually given what we call the tune to sing, while the basses are only given something which accompanies the tune.

So when we are playing the piano, if the tune is in the top notes of the right hand, we can use both hands and all our fingers with equal force, and the tune will stand out clearly to the ear, because the ear is more sensitive to high tones. But sometimes a piece is written with the tune for the left hand, and the accompaniment for the right hand. In such a case, if both hands play with equal force we shall not hear the tune properly, but shall mainly hear a meaningless accompaniment. The player, therefore, must play lightly with his right hand, and pick the notes out strongly with his left hand, so as to compensate for the fact that the ear is more sensitive to high than to low notes.

On the other hand, it is very interesting to observe that, so far as the startling, or fear-producing, effect is concerned, low notes are vastly more powerful than

high ones. The sudden sound of a flute, even loudly sounded—and of course, being high-pitched, sharply heard by the ear—has no startling quality at all compared with a roll of distant thunder or any kind of sound that resembles a growl. It is very noticeable in babies and small children that a low-pitched voice may frighten them, even though it is heard far less intensely by the ear than a high-pitched voice would be. The reason probably is that the lower sounds, though less acutely heard, more closely correspond to the voices of those animals, such as the lion, which hunt living prey.

HOW TO DRAW A PICTURE OF A SOUND ON A SHEET OF PAPER

So much for the loudness of sounds. Our next concern is with the pitch of musical tones; and it is easy to show that the difference between a high note and a low note lies in the difference between the number of waves that strike the ear in a given time. It is not difficult to prove this, because we can take a tuning-fork and set it vibrating, and make one of the prongs, or something attached to one of them, scratch a record of what happens upon a piece of smoked paper, which we can move at a known rate close to the fork. In this way we shall get an up-and-down line marked on the paper, and may actually count the number of vibrations made in each second by the particular fork. We then find that the greater the number of vibrations, the higher the pitch of the sound.

Gradually the tuning-fork ceases to sound, and the note becomes fainter; but its pitch does not alter, however faint it is. If we look at the record made by the fork upon the paper, we can at once see the reason of this. The size of the waves steadily lessens as the fork loses its energy, and so the sound becomes fainter; but the number of waves in each second remains the same, however small they are, and that is why the pitch of the note is unaltered.

HOW THE SHRILL SIREN GOT ITS MUSICAL NAME

The best instrument for studying the pitch of musical sounds is called the siren. Siren was the name given to an imaginary kind of being—half woman and half bird—who sang so beautifully that no one could resist her; and it is by way of a joke that the name has been given to the modern siren, which produces notes that belong to the musical order, but certainly could never charm anyone. The siren is simply an arrangement by which air is blown along a tube; but across the nozzle of the tube there is turning a flat piece of metal with a lot of holes in it, so that the air can only pass through when the holes come opposite the tube. If we know how many holes there are, and how often the disk spins in a second, we can tell the number of waves which are being produced to make the sound that we hear.

If we begin very slowly, there may be, perhaps, only ten holes coming opposite the tube in a second; that simply means ten puffs, or blows, or waves, in a second. Now, it is true that we may hear each of these as a little puff; and we do so because each little puff causes something or other in the neighborhood to begin vibrating at a rate which it is possible for us to hear.

A WHISTLE THAT GIVES THIRTY THOUSAND PUFFS IN A SECOND

But the ten puffs in a second, taken together, do not make a sound for us. However, if the number reaches twelve or thirteen, a few people with exceptional hearing will be able to hear an extremely deep, low-pitched note, and people with ordinary, healthy ears should hear a low note when the puffs reach about sixteen a second.

As we increase the number, the pitch of the note we hear rises, until it becomes an intensely high sort of whistle. There may be now thirty thousand puffs in each second, or more. Now, if a number of people are listening, especially people of different ages, it will be found that one after another ceases to hear anything at all, while the others still hear an intensely high whistling note. As a rule, it is the elderly people who cannot hear these very high notes.

In the end of last century Sir Francis Galton made many very interesting experiments on animals with a whistle which produced extremely high-pitched notes, and he found that lions and cats were peculiarly sensitive to these notes, though other animals did not seem to pay any attention to them whatever.

THE NEXT PART OF THIS IS ON PAGE 4903.

The Giant's Causeway in Ireland, showing the curious pillar-like formation of the basalt rock.

IS A STONE ALIVE?

CONTINUED FROM 4817

THE answer to this tremendous question depends on what we mean by alive. Animals and plants do certain things which no stones or rocks do. Stones take curious and regular forms, as in crystals and in the columns of the Giant's Causeway in Ireland, shown in the picture on this page. Crystals grow, and sometimes it looks as if little crystals grew from them; but they do not breathe, and they have not certain other powers which even the simplest and humblest of living things possess. So we must say that, in the strictest sense of the word, stones are not alive.

But that is very far indeed from being the whole answer to the question. It is a proved fact that the substance of which stones are made can help to build up the bodies of living creatures, and these bodies can be broken down into simpler chemicals and made into stones. This seems very curious, but it is true.

Silicon is the name of the commonest element in rocks and stones and sand and clay, and we find that it helps to form the living body, as in the case of wheat, the straw of which always contains some amount of silicon. What is true of stones and silicon is true of many other kinds of "dead matter," as it used foolishly to be called by people who thought they exalted themselves by decrying matter, which is yet the "mother of life." All living things are made of "dead matter," so called, and of nothing else; and their life absolutely depends upon the intake of "dead matter"—air and food—from moment to moment. We can only conclude, not less certainly the more we study rocks and stones and trees, that there is one great Power, that can express itself in the making and the history of atoms, in rock and plant and animal and man—the Power "whose dwelling is in the light of setting suns and the round ocean and the *living* air and in the mind of man."

DID THE EARTH GO ROUND FASTER BEFORE IT COOLED DOWN?

This is not a question which anyone can answer very positively, for, of course, none of us was there to see how the earth behaved before it cooled down. Yet there are very powerful arguments which suggest that the pace at which the earth spins must now be gradually but certainly growing slower, and that, of course, means that long ago it went round much faster than it does now. What we call a day is, of course, the time in which the

earth makes one complete turn. It is probable now that the earth lags a few seconds behind the clock, so to speak, in each century, and careful reckonings which have been made—though, of course, there must always be a great deal of doubt about the matter—led Sir George Darwin to the opinion that at one time the day—that is to say, the period of the earth's rotation, or the time it took to turn once—must have been about four hours long, instead of twenty-four hours, as it is now, and that in the far distant future it will be thirty hours or more.

The cause of this slowing of the earth's spinning is mainly to be found in the tides which are raised upon it, chiefly by the moon, but also to some extent by the sun. Even long before the earth cooled down these tides must have existed, though they did not then consist of water so much as of the molten material which afterwards became solid, and formed the rocks that make the crust of the earth. The tides act as a brake, constantly rubbing against the spinning earth, and thus steadily causing it to spin less quickly.

WHY IS IT THAT IRON DOES NOT BURN AWAY IN THE FIRE?

When anything burns away in the fire, as we say, what happens is that the substance of it has combined with the oxygen of the air to form compounds called oxides. Sometimes these oxides are in the form of gases and fly away into the air, and so the thing wastes, and sometimes they are in the form of solids which usually crumble away very readily.

What the fire has to do with it is this, that most things will not combine with oxygen until they are fairly warm, and the fire simply raises them to the temperature at which they can begin to burn, just as when we apply a match to a candle.

But it is not true that iron does not waste with fire, though it only does so very slowly at the temperature of an ordinary fire. Iron is capable of being burned, just as most other things are, only it requires a very high temperature for this burning to go on at all rapidly.

At lower temperatures, however, iron burns, or wastes, slowly. It even does so in the absence of fire altogether, especially if there is a certain amount of moisture present. This wasting of iron we call rusting, and the rust is made of iron combined with oxygen.

WHAT MAKES THE FIRELIGHT DANCE?

If coal were a simple thing, such as pure carbon, and if it were evenly supplied with a steady draught of air, then the firelight would not dance, but would be quite steady. It dances as it does because the processes of burning go on so very irregularly in the fire. For one thing, the supply of air is not quite constant, for the draught up the chimney is considerably affected by the movements of the wind at the top of the chimney. This, of course, must affect the flames of the fire and make them dance.

But that is not all. In coal there is imprisoned a great quantity of gases of various kinds, all of which can be burned. As the coal breaks up in the fire, these gases escape, here and there, and it is when they burn that they make the beautiful flames of various colors that dance, and so throw a dancing light into the room.

If we burn coal from which the coal-gas has been removed—coke, as we call it—we get a very hot fire, but one without flame or with very little flame, because we are practically burning nothing but the solid carbon itself. In an ordinary fire a certain amount of the gases and a great deal of the carbon itself go up the chimney unburned, which is, of course, a great waste, to say nothing more. That is part of the price we have to pay for pretty open fires which are more wasteful than those burned in stoves or furnaces.

WHY DOES THE LIGHT GIVE LIGHT?

This sounds at first as if it were rather a foolish question, but it is really a very wise one. We know that what we call light is a wave-motion in the ether, just as we know that what we call sound is a wave-motion of another kind in the air; but there still remains the question for us to ask and answer if we can—Why does the one kind of wave-motion produce in our brain the effect we call light, and the other kind of wave-motion the effect we call sound? Why should not the air waves produce the effect of light and the ether waves produce the effect of sound?

We can only answer this by saying that

the brain is so made. We can imagine as a famous student of the mind—Professor James—has said, that the nerves from the eye might run to the hearing centre of the brain, and the nerves from the ear to the vision centre; or we might imagine that when we went to a concert we should see the music and hear the movements of the conductor and the players. This is simply another way of saying that what we call light and sound are the consequences of the behavior of those parts of our brain which correspond to them.

It is extremely interesting that in some people there are what are called *associated sensations*. In these cases, when one part of the brain is excited, as by a sound, another part—the part that sees—is excited also. In such cases we may say that a sound gives a light. Such people, when they hear the sound of a trombone, will at the same time see a crimson color; or when they hear the sound of another kind of musical instrument they may see a blue color. These cases seem very extraordinary, but they really do happen.

WHY DOES CELLULOID CATCH FIRE SO EASILY?

Paper catches fire easily because it is made from vegetable substances which contain large quantities of carbon and hydrogen, and not very much oxygen. So, when it is made hot by a match or some such means, the carbon and hydrogen of the paper combine with the oxygen of the air, and the paper burns.

Now, celluloid is made from paper or other vegetable fibre by the use of strong acids and camphor, which produce a new compound. When hot it softens, and can then be molded into various forms, which it retains after it has been cooled. Celluloid has very much the same composition as paper, though it differs in some respects, and it burns for the same reason as paper does.

The material that makes the hard part of plants, and from which paper is made, is called cellulose, and it belongs to the same class of substances as starch and sugar. The chief source of celluloid is cellulose combined with a proportion of nitric acid.

WHY DOES A MATCH FLARE UP WHEN TURNED UPSIDE DOWN?

We can find the key to this question if we remember what happens when a match is burning. It is burning because the wood and the other materials in the match—or the wax, if it is a wax match—are combining with the oxygen of the air, and it will go on doing this as long as there is sufficient material to burn. In the case of a wooden match held upright, the flame is sometimes likely to go out because it is starved for fuel.

This is less liable to happen in the case of a wax match, because the burnable part of a wax match is largely made of materials which are what we call *volatile*. This means that they turn into gases and rise up when they are heated. But in a wooden match there is not nearly so much of this material, and so it is likely to go out; but if we turn it upside down, then the flame finds an abundance of material on which to feed.

The same is true, as we know, of burning paper, and this is natural enough, because paper and wood are made of the same material, which belongs to the same class of chemical substances as sugar and starch. Unlike the materials that make a wax match, very few of these substances are volatile.

DOES THE SUN NEVER SHINE IN THE NORTH?

The sun does sometimes shine in the north. It all depends upon the place from which we are looking at it. It is the northern half of the world that most of us who read this book live in, and it is the northern half of the world that has made the whole of the records of civilization. Thus the sun has always been known to shine in the south.

Long ages ago, when men voyaged south of the equator and rounded Africa, they reported that on their journey they found the sun shining in the north. This was utterly ridiculed when they came home, even by the greatest writers of the time. But we now recognize that this account of what these travelers saw is very good evidence that they did what they said they had done.

Whatever part of the world we are in, the sun always rises in the east and sets in the west, because the whole earth is, of course, spinning in the same direction, and it is that spin that makes the sun appear to rise and set. But if we are looking at the sun from the northern half of our planet, it appears to travel across the sky in the south; while if we

look at it from the southern part of our planet, it seems to travel across the sky in the north.

We can understand this if we make a picture of the sun in our mind's eye, say, at the level of the floor, and the earth traveling round it at the same level. Then we shall understand how it will appear differently, according to whether we are looking downwards at it from the upper side of a ball, or upwards at it from the lower side of a ball.

ON WHAT DO FISHES FEED?

We all know that the big fishes feed on the little fishes, but the little fishes must feed on something, and as it is very important that there shall be enough fishes for us to eat, it is very important to know what it is that the smallest fishes feed on.

Now, we know that, on the land, plants are the producers and animals are the consumers; the same is true of the sea, which has its pastures, just as the land has. The sea contains vast quantities of humble plants together with humble kinds of animals, which feed on the plants, and these, between them, furnish the food for the smaller fishes.

The huge masses of tiny vegetables and animals floating in the sea have the special name given to them of *plankton*, and it is on this plankton that the smaller fishes and the youngest fishes feed. It seems to be just at the time of year, in the spring, when the plankton is very abundant, and of a very suitable kind, that the small fry of most of our fishes are produced. Later in the year the plankton changes, and seems just to suit the young fishes when they have grown.

It seems to be clear now, also, that the action of light falling upon the sea has the same effect as when it falls upon the plants of the land. Much of the vegetable life that goes to make up this plankton has chlorophyll in it, or something which is a variety of chlorophyll—the coloring matter of green leaves—and by virtue of this it has the power of feeding on the gases dissolved in sea-water, just as land plants feed on air.

WHAT IS A SPONGE?

Every sponge was once alive. The best way of putting the answer to this question, perhaps, is to say that a sponge is the skeleton of a living creature. By skeleton we simply mean the supporting framework of a body. The skeleton of any of the higher kinds of animals is made of bones, and a sponge, of course, is not made of bones nor of bony material, but it is a skeleton nevertheless.

The creatures which make sponges and live in them are of a very humble kind, and inhabit sea-water; they are far lower in the scale of animal life even than worms or oysters or star-fishes. We must not think of the sponge as the skeleton of a single animal; as a matter of fact, it is made by a colony of very simple creatures which live and work together, so to speak. Instead of being separate from each other and swimming about, they make a colony. As their numbers increase, so the sponges they live in increase in size.

The material of which sponges are made is all derived by the creatures from the sea-water in which they live. There is only one kind of sponge that is of much use to us—that which forms a more or less soft skeleton. But other kinds of sponges take other materials out of the sea-water and make a skeleton out of them. Thus, some sponges are quite hard and stony, being derived from the salts of silicon which are in sea-water; and others have a more chalky kind of structure.

In every one of these cases the great marvel is the chemical power of the tiny animals which pick out from the various salts dissolved in sea-water just those which they require, and then build them up into the wonderful thing which we call a sponge.

HOW DOES A SPONGE HOLD WATER?

The behavior of a sponge with water is similar to that of a lump of sugar. It is not easy to understand so long as we study a complicated thing like a sponge or a lump of sugar, but we get the key to it if we study what is really a simpler case of the same thing, and that is the behavior of a fine glass tube. Any kind of tube will do, but a glass one is convenient because we can see what is happening inside it; the finer the tube, the more clearly shall we see what happens. A very fine tube is something like a hair, and so this subject which we are studying is called *capillarity*, from the Latin word for a hair. If we take such a tube and dip it into water we shall find that,

without our sucking the tube, the water runs up inside it to a higher level than outside; and the more hair-like the tube, the higher the water will run.

Other fluids, however, will not behave in the same way as water. Mercury, for instance, will be pressed down by the tube, and will stand at a lower level inside it than outside. All we can say is that the surface of the water catches on to the side of the tube and creeps up it a little way.

Now, a sponge or a lump of sugar is really a very complicated system of small irregular tubes, and water behaves with regard to them just as it does with regard to a simple single glass tube. On the other hand, mercury will not run up at all either into a lump of sugar or into a sponge. The rising of the water in the tube, or the sugar, or the sponge, has nothing whatever to do with the atmospheric pressure, and is therefore quite a different matter from its rising in a tube when the end of the tube is sucked by anyone.

WHY DOES A LIQUID RUN UP A TUBE WHEN WE SUCK IT?

We know very well that something we do makes the liquid run up the tube, for it stops doing so when we stop sucking, though, if we seal the top of the tube with the tongue, the liquid will not fall back. Now, when we feel that we are sucking the liquid up, we are apt to suppose that we are pulling the liquid up the tube; but this is not at all what is happening. Though it looks as if the liquid were being pulled or dragged up by something, it is really being pushed, and what pushes it is the air.

When we suck liquid up a tube we are lessening the pressure of the air inside the tube, and the pressure of the air on the surface of the liquid we are sucking squeezes it at once up into the tube where we have made room for it to go. We make the room, and the air pushes the liquid into it. Every kind of sucking, or suction, to use the proper word, is of the same kind. What seems like pulling is simply clearing the way so that whatever is behind can be pushed. If the air is thick and heavy, it presses harder than if it is thin and light. So in different states of the air, which usually mean different states of the weather, the height of the column of any particular liquid that the air will push up a tube varies. More liquid will be pushed up when the air outside is heavy, and less when it is light. So if we make a tube and seal the top of it, we have an instrument that will measure the pressure of the air from time to time, and we call this a barometer.

WHY DOES WATER FREEZE?

This sounds quite a simple question, but, indeed, no one can answer it yet. We do not know why taking heat out of water should at last turn it from the liquid into the solid state. It is believed, however, that we are wrong in supposing that there is a perfectly sharp line between the liquid and the solid state of water or of anything else. It is probable that water turns into ice or ice into water through unbroken stages. Only in most cases, and certainly in that of water, these happen so quickly that we have not time to notice them. In other cases, as in that of sealing-wax, the change from the solid to the liquid state is not so apparent.

If we are ever to learn why water freezes, we must certainly discover all we can about the nature of ice, and it is not difficult to find, in the first place, that all ice is made up of crystals. So we must understand crystals, and the reason why so many kinds of matter, when solid, form themselves into crystals.

This is a most difficult subject to study, but the laws of crystals are being very slowly worked out, and when that is done, perhaps we shall be able to say why it is that water freezes when it is cooled, although we cannot do so now.

WHY DOES ICE TURN INTO A LIQUID WHEN IT IS HEATED?

This question is, perhaps, really the same as the last, yet, in a way, it is easier for us to understand why ice turns liquid when heated than why water turns solid when cooled. We have a good working idea of what heat is. We look on it as a movement in the atoms and molecules of which matter is composed. Cold, we know, is simply the absence of heat. So we can understand why solids, especially a crystalline solid like ice, turn liquid when heated, because we can imagine the particles of them beginning to move to and fro so rapidly that they can no longer hold together in the regular way required to make the crystals of a solid substance.

WHERE ARE THE CLOUDS WHEN THE SKY IS QUITE CLEAR?

Clouds, as we know, are made of water, and water can exist in the air in many different forms. When it forms a cloud, it is really in the form of very small liquid drops, like the collection of drops that forms a cloud from our breath on a frosty day.

The water that formed the clouds is still in the sky when it is cloudless. What has happened, however, is that, partly owing to the warmth of the sun, and partly, no doubt, to electrical conditions in the upper air, the atmosphere is capable of holding all the water in it in gaseous form.

This gaseous water, or water-vapor, is just as transparent as air itself; indeed, it is much better for us to regard water-vapor as one of the things that make up the air, just as much as oxygen or nitrogen. It is difficult for us to realize, perhaps, when we look up at the sky on a cloudless day, that we are looking through water, but we are certainly doing so just as if we had our eyes open under water and were looking up. If it were not for the water that forms part of the air, we should be utterly scorched by the heat of the sun. As it is, however, most of the sun's heat is caught by the water-vapor, which is very opaque to heat, though it is very transparent to light.

WHERE ARE THE FISHES THAT LIVED IN THE SHELLS WE FIND BY THE SEA?

The fishes that lived in these shells have died. In some cases they have been eaten by other creatures. More often, probably, they have died, and then their bodies have been gradually dissolved by the sea-water, and have also been digested by the tiny creatures, too small for us to see, that live in sea-water. The shells made by these fishes are really their skeletons, and, being harder than the rest, they remain behind when the animal dies, just as the skeleton of a land animal or of a sponge remains.

Now, if we compare these skeletons with the skeleton of a real fish, we at once see that these creatures are not fishes at all. We only call them fishes, or shell-fish, because they live in the sea, but they are utterly unlike fishes in every respect. They are, indeed, more unlike fishes than fishes are unlike ourselves. Fishes, like ourselves, belong to the great group of backboned animals which have their skeletons inside their bodies, and though they are the lowest of all backboned animals, and we are the highest, yet we belong to the same class. Shell-fish have no bones of any kind, but they make their skeletons on the outside of their bodies. In all the other details of their lives and structure they differ completely from even the simplest of the real fishes.

WHEN BEES TAKE HONEY FROM FLOWERS, DO THE FLOWERS GET ANOTHER SUPPLY?

It is a mistake to suppose that bees get ready-made honey from flowers. No flowers contain honey as we know it; honey is a thing specially made by the honey-bee from materials derived from the flower. The sugary material produced by the flower is not honey, and does not exist to serve the bee. It is made by the flower for its own purposes, but it serves the flower indirectly, because the visit of the bee is of value in helping to fertilize it.

The flower does get more of this material, although it can by no means make a fresh supply at once, because the production of the sugary substance, to which the bee helps itself, is a long and difficult chemical process, depending upon sunlight, the drawing up of water from the soil, and the slow building up inside the plant of sugar and other very complicated chemical materials from the very simplest things.

HOW IS A DELTA MADE?

We must first of all understand what a delta is and why it has been given that name. If we look at the map of Egypt, we shall find the Nile, which is a very good example of a river with a delta at its mouth, and we shall notice how the river, when it meets the sea, spreads out into a shape something like a triangle. Now, that is the shape of the Greek capital letter D, the name for which is *delta;* and so this shape, made at the mouth of such a river as the Nile, is called its delta.

When a river meets the sea, the water of the river runs into the sea. The tides of the sea also affect the river, and salt water will be found for a certain distance up the river, and also various forms of animal and vegetable life, principally fishes, which live in sea-water. Also, for

a certain distance up the river, varying very much in different cases, the height of the river will rise and fall with the tides. We can see this, for instance, in the docks upon the river of any great port.

But a river consists of moving water, and the motion of the water has power to rub away from the bed and from the banks of the river a large quantity of solid material, which is not melted or dissolved in the river-water, but is carried down by it. Now, when the river-water meets the sea its pace slackens, because it is opposed by the weight of the sea-water. Therefore, the solid matter held in the river-water is likely to sink and form a great, wide bed or bank of mud. When, as in the case of the Nile, the river has two or more main branches, the deposit enclosed by these and the sea takes the form of a triangle. Deltas are nearly always found at the mouths of rivers which flow into lakes, or enclosed seas, or sheltered gulfs, because there is in all these cases an absence of opposing currents.

WHY ARE SOME THINGS GOOD FOR GROWN-UPS AND NOT FOR CHILDREN?

Perhaps the real truth of the matter is that grown-up people and children do not differ from each other so much, after all, and the things which are really bad for children are not very good for grown-up people; but it is certainly true that things which would injure children very much may not hurt grown-up people.

There are three reasons for this. One is that, as children have very small bodies, it naturally takes a much less quantity of harmful things to hurt them. Another reason is that the body has great power of learning to protect itself against harmful things, and so in many cases grown-up people are able to take these things, such as tobacco or alcohol, without injury, not because they are grown up, but because their bodies have learned how to do so. Even a grown-up person taking tobacco for the first time is likely to suffer severely.

But the third reason is the most important. It is true of all kinds of living beings that they are more easily injured when they are developing. We can understand in a way how this must be, for developing is a very much more delicate and difficult process, surely, than merely continuing in the same state, which is all that the grown-up body has to do; and so we may expect that the developing body must be more delicate, seeing that it has only one way of going right, and that there are so many ways of going wrong. Only those who have studied development can understand how grave is the effect of poisons, like alcohol and tobacco, upon the developing body of a child.

WHY DOES A BOY'S VOICE BREAK AND NOT A GIRL'S?

When a boy's voice breaks, it is because his voice-box is suddenly becoming larger, and as a girl grows up to be a woman, her voice-box grows steadily in proportion to the rest of her body. But, for some reason, Nature prefers that men shall have much deeper and louder voices than women. In order that this shall be so, the larynx, or voice-box, must be much larger in proportion, and the vocal cords much longer in men than in women.

This special change begins to happen when a boy is about fourteen or fifteen years of age. It is not really necessary for a boy's voice to break—that is to say, it is possible for his voice to get steadily and evenly lower. But, as a rule, this does not happen, and the reason is, not that there is anything the matter with the boy's voice-box, but simply that he has not learned how to work it.

The muscles are growing bigger and heavier, the cords are growing longer, and this is happening very quickly, and, of course, it must mean that new skill must therefore be acquired, just as if one had learned to play perfectly on a very small violin, and then had to play on a full-sized one. That is why the boy has not the proper control over his voice, and sometimes speaks in a low pitch and then suddenly in a high one.

WHY DOES A STICK MAKE A NOISE WHEN SWUNG IN THE AIR?

All kinds of noises, however different from each other, and all kinds of musical notes, high or low, round or thin, are really of the same nature in the chief respect that they all consist of waves of a certain kind, produced in the air, as a rule, though they may be produced also in solids or in liquids. These sound waves are of a special kind, and consist of a swinging to and fro of the tiny particles of whatever medium is carrying

the sound—air, or water, or rock, or whatever it may be.

If air were not elastic it could not carry such waves, for the parts of the air pushed forward by anything would not swing back again, and so there would be no sound waves produced. Therefore, if we want to interfere with the traveling of sound, we use something like sand, or cotton-wool, or sawdust, and these things, not being very elastic, have the effect of damping down the sound waves.

Not until we know what sound is can we hope to understand the answer to this question, but when we have learned the main facts about sound, the answer is easy. Thus elastic air is disturbed when a stick is swung through it, for countless millions of atoms of the gases that make up the air are quickly moved aside to make room for the stick.

They strike the atoms next them, and, being elastic, they rebound. The atoms struck do the same, and for a little while all the atoms of the air are swinging backwards and forwards, and that motion makes the sound wave which we hear as a humming noise.

Is it possible to see the smallest things?

The smallest of all things that have ever been discovered are tiny particles of electricity, called electrons, which live inside and help to make up the atoms of matter. These things cannot be seen. Very much larger are the atoms which they go to make up. An electron compares with an atom as a speck of dust compares with a large ball. Atoms cannot be seen. If we take the most powerful of all microscopes, and use the light which is the best for the purpose—that is to say, violet light—and make all the conditions as perfect as can be, then the smallest thing that we can see will be roughly about five thousand times as large as an atom; and we have already seen that an atom is huge and vast in comparison with the size of the tiny particle called an electron.

The electron is probably the smallest thing there is, and all electrons from all kinds of matter seem to be exactly the same. But we do not need to go down to anything nearly so small as an electron, or even an atom, to pass beyond the lower limit of our vision, although it is aided by the most perfect microscope.

In order to see a thing as a separate thing, it must not be smaller than half the length of the waves of the light by which we are seeing it. When we have reached that point, we have reached the final limit of all our vision in this direction. That is not to say that we cannot find clear proof of the existence of things too small to see, so that we can indeed see them "in the mind's eye."

Is it true that we cannot bleed unless a hole is made in our veins?

It is true that our blood is shut in a set of closed tubes called arteries, veins, and capillaries, and we never can bleed, even to the slightest degree—say, when we brush our teeth—unless, somehow or other, a hole has been made in the wall of one of these tubes. A little scratch anywhere in the skin is certainly not likely to strike an artery, for these usually lie deep; nor yet a vein, for though many veins lie just under the skin, and though their walls are much thinner than those of an artery, they are too thick for a slight scratch to pierce them.

In between the arteries which carry the blood from the heart and the veins which return it to the heart, the blood runs in tiny little tubes as slight as hairs, and therefore called capillaries, from the Latin name for a hair. These capillaries are simply everywhere in the body, except in one or two special places where there are good reasons why they should be absent, such as the clear front part of the eye. If that is scratched, or even pierced, it does not bleed at all. Everywhere else the slightest scratch is likely to tear or cut a few capillaries, so closely do they lie, and then, of course, we bleed.

There is no pulse in the capillaries, and so the blood just oozes out; but if an artery is cut, like the artery we feel at the wrist, the blood leaps out in pulses.

There would be no sense or use in the blood at all if it simply went round and round in these closed tubes, and nothing happened until they were cut. But all sorts of things—except red blood-cells—are always passing in and out through the walls of capillaries, and that is why we have blood at all.

THE NEXT QUESTIONS ARE ON PAGE 5019.

POISONOUS OR UNWHOLESOME AMERICAN FUNGI

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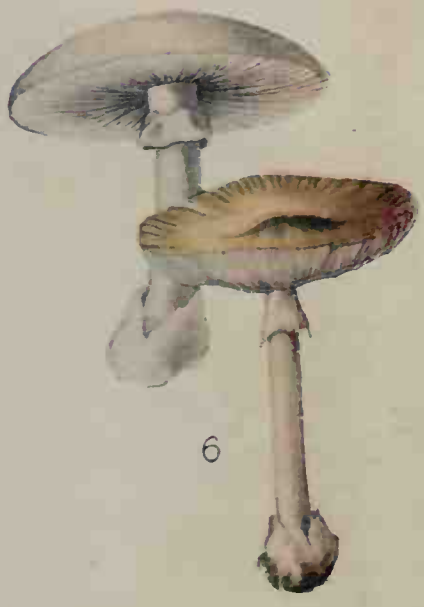

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1. Stinkhorn, or Fetid Wood-witch (Phallus impudicus)
2. Poisonous Fairy-ring. Agaric, (Marasmius urens)
3. Red-juice Mushroom (Hygrophorus conicus)
4. Deceiving Clytocybe (Clytocybe illudens)
5. Fly Mushroom (Amanita muscaria)
6. Death-cup, or Spring Mushroom (Amanita phalloides); two varieties
7. Red-milk Mushroom (Lactarius rufus)
8. Fiery Boletus (Boletus piperatus)
9. Emetic Mushroom (Russula emetica)

WHERE MUSHROOMS MAY BE FOUND IN THE SPRING

MUSHROOMS, EDIBLE AND POISONOUS

CONTINUED FROM 4763

ALMOST any morning in early summer the President of the United States can look out of his window and see, on the lawn gently rolling away from the historic White House, something that at first glance looks like tiny eggs. He may wonder if the children who come there on Easter Monday, to celebrate "egg-rolling day," have forgotten their hard boiled eggs; but a second's thought will make him remember, if not too occupied with affairs of state, his boyhood days when, as he roamed the pastures and woods, he saw these same "fairy rings" of "toadstools," with the brighter green circle of the grass surrounding a faded patch within. Perhaps you, too, have seen them, even if not on the White House grounds.

Perhaps you have pretended, as children have for centuries, that nimble elves and goblins have danced the night long within the magic ring that so mysteriously has sprung into being over night, and that they wore the grass out with their pointed slippers. Probably you've called them toadstools and thought them poisonous. If you found them *in the open pastures or fields* they are not often harmful. Those that grow in *woods* are not safe to eat. So be sure not to experiment until you learn more about mushrooms and their habits and appearance.

Many people call all fleshy *fungi* toadstools; but it is not certain that toads ever use these queer growths for resting places, and it is quite certain that the right name for them is mushrooms, which, some think, is derived from two Welsh words meaning field and knob. Others think that the word has something to do with moss. Some mushrooms are edible and some are very dangerous to eat. One must learn something about them before eating them.

MUSHROOMS HAVE BEEN KNOWN FROM VERY EARLY TIMES

From the first century and perhaps earlier times, we have records of mushrooms as an article of food, and abundant fossils of mushrooms in the vast coal and peat deposits show that millions of years ago, when this old, old world of ours was a very different place, the almost inconceivably gentle pushing of these fragile growths managed, as to-day, to break a way through the ground, even lifting hard clods and pushing aside stones.

MUSHROOMS ARE EATEN FREELY IN EUROPE AND ASIA

Very early historians and writers mention mushrooms. One Roman historian tells of "fine knives and razors of amber and other dishes of silver," which the cooks used in preparing these delicacies for the epicures of his

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time. Another old writer, however, thought them not at all wholesome. "For every hue they display," he writes, "there is a pain to correspond to it." Possibly those employed by wicked persons of that age to prepare deadly concoctions used the poisonous mushrooms, and Nero, cruel monarch of Rome, fed a large party of invited guests on mushrooms he knew would cause their death.

Romans still eat mushrooms and statistics show that thirty tons are annually used in Rome. In fact, most of the inhabitants of all European and Asiatic countries scour the fields and woods for mushrooms, and, as they seldom have meat, these rapid growth *fungi* supply its place. China imports mushrooms from Japan and other Pacific islands to supply the demand and even has officially issued for free distribution "Anti-Famine" books about mushrooms and their food values. In Southern Europe dogs and pigs are trained to hunt for one sort called truffles, which grow under the fallen leaves of the vast forests; and as the animals, too, like to eat them, the men have to scramble to gather them first as they are uncovered by the sharp little hoofs and claws.

THE VEGETABLE MEAT SO PLENTY AND CHEAP

Truffles have not yet been found in the United States, but Americans are beginning to realize that right at their door is a substitute, in many varieties of mushrooms, for the meat that is constantly growing dearer. Since the flavor of different varieties resembles oysters, beefsteak, chicken, sweet-breads and fish, it is no wonder that they are often called vegetable meat. Of course, they have not so much food value, pound for pound, as meat, but when they can be had for nothing, they should not be neglected.

The odor of mushrooms sometimes resembles that of other plants or fruit, such as garlic, apricots, radishes, fresh meal, or anise. In proportion to the number of varieties, those known as dangerous are no more than among flowering plants. To Dr. M. A. Curtis of North Carolina belongs the credit of the first systematic classification and study of mushrooms in the United States, and already over two hundred varieties are listed as perfectly safe.

Mushrooms are a division of *Fungi*. Mildew, mold, rust, smut in grain,—all are forms of *fungi*. The fleshy sort that have queer shapes like umbrellas, nests, hoofs, shells, clubs, spheres, hemispheres, cones, bears' heads and ears, although flowerless, are profuse and well known. They spring up over night from April to late fall and are the fruit of a running white moldlike growth spreading through dead leaves, earth or decaying wood. After a rain or other favorable conditions a certain point in this mass of fibres suddenly begins to grow. In a few hours it has pushed up out of the ground like an egg and in another hour or two the outer envelope or veil is broken, sometimes leaving remnants on the cap and sometimes showing a ring of itself under the cap on the stem.

THE WONDERFUL SEEDS OF THE MUSHROOMS

Edible *fungi* are surprisingly different in appearance, ranging from coral-shapes, or fluted vases to the usual umbrella form. One has been known to grow to weigh thirty pounds. They have no seeds, but produce "spores," which are as fine as dust, and singly, are invisible to the naked eye. The dust-brown spores of the puffballs are inside; the spores of the *Morel*, which is unlike any other fungus and is always edible, are in delicate sacs on the cap which finally burst at the tip; those of the gill-bearing mushrooms shake down from the fanlike drapery attached to the under side of the cap, and those of the cushioned sort, whose surface is evenly punctured with very numerous little holes as if pricked with a pin, shake themselves out as pepper comes from the shaker. One can "take a picture" by nature's own developer of any of the last two sorts, in natural colors, too, if he will cut off the stems of several mushrooms, close to the cap, and place, gills or cushion down, upon sheets of white or colored paper. As some of the spores are white it is well to use both kinds of paper for each specimen until one becomes acquainted with the spores. Cover with a glass dish, or, at least, be sure that no draft of air disturbs mushrooms or papers, and in a few hours, or in the morning, if you leave them over night, you will have an exact reproduction of the mushrooms from their own active spores. Try it; it is one of the most interesting of things to do. Those that have colored spores reproduce each delicate shade, while the white ones are as soft as snow.

EDIBLE AMERICAN MUSHROOMS

1. Beefsteak or Liver Fungus (Fistulina hepatica)
2. Meadow Toadstool (Lactarius distans)
3. Morel (Morchella esculenta)
4. Chantarelle (Cantharellus)
5. Coral Fungus (Clavaria Rugosa)
6. Fairy-ring Mushrooms (Agaricus)
7. Cultivated Mushrooms; young and old
8. Forest Mushroom (Agaricus silvacola)
9. Edible Boletus; young
10. Ochre-gilled Russula (Russula ochraphylla)
11. Velvety Clitocybe (Clitocybe velutipes)
12. Bear's-head Mushroom (Hydnum caputursi)
13. Oyster Mushroom (Agaricus ostreatus)

Mushrooms have to live on food manufactured by other plants, vegetables or trees, and their spores are quite particular where they shall start their own life as mushrooms. Some baby spores grow only if they alight upon the spines of a dead chestnut burr, others like sawdust, oak leaves, dark coal mines, or decaying animal substance of various kinds. It has been estimated that from one puffball, so aptly called an "elfin teepee" with its thread of invisible spores rising like smoke, come at least 10,000,000 spores, and they must fall on exactly the right spot before setting up their own lives. Old-fashioned doctors used these spores to staunch fresh wounds.

Food which is found in fields and woods

Mushrooms are greedy eaters, grow rapidly, and decay soon. Some sorts respond to artificial culture through "spawn," which is the threadlike substance which goes through muck as yeast does through unbaked bread, and many people make comfortable livings by raising them. But they are so abundant in the United States that almost any one having access to the open may gather during the summer and fall "an hundred weight of wholesome food rotting under the trees," if he knows the right mushrooms to pick. But as a whole they do not bear transplanting, nor respond to cultivation. Instead they stand on their one leg, quite independent of any one.

Because some mushrooms are delicious eating while others are extremely poisonous, one must learn a great deal about them before venturing to cook and eat. He must become acquainted with their manner of growth, their color, odor and general appearance. The prejudice against mushrooms is needlessly sweeping, but careful instruction will teach a few, at least, of the edible sorts, and the deadly varieties are easily recognized. Each must be learned as we learn to tell the difference between a blue jay and a robin. However, there is *one* and *only one* infallible sign that a mushroom is poisonous—*the presence of the "cup" or socket from which the stem grows.* It is *always* below the surface of the ground—LOOK FOR IT. Any mushroom that turns blue when cut or bruised should be let alone; any having worms or decayed have an unpleasant smell, and again, if you taste a small bit, and the mushroom stings, is bitter or otherwise unpleasant, or exudes a milky juice on being cut or wounded, be sure to leave it alone. Shun as poison a brilliant cap of yellow, orange or even scarlet, studded with white or grayish spots, for this produces the deadly "fly-poison." Czar Alexis died from eating this sort, as did several noted French *savants.*

Mushrooms which may be used as razor strops

Some people say that any mushroom that grows on a tree is poisonous; but those growing *sidewise* from position, with dirty-white gills and a light brown or buff top are safe according to eminent authorities. From some of these flesh-like growths, however, comes tinder, punk and touchwood, and the phosphorescence that makes old wood gleam in the dark is decaying *fungi.* One lovely white mushroom springing up over night contains the most deadly vegetable poison known, and one growing on the birch tree can be used as a razor strop!

Aside from the deaths that occur from careless handling of known poisonous mushrooms some people have died because they gathered them when decayed, or they did not cook them *at once.* As mushrooms are so like animal food they have the same tendency to decay, and who would think of eating putrid meat? In gathering, *be sure to look beneath the surface of the ground for the telltale "cup,"* use a sharp knife, cut an inch or two from the cup so no dirt will adhere to the mushroom, and before putting in your basket, it is better to wrap each specimen in tissue paper which you have provided. It keeps them unbruised, and if you have taken one that is not quite safe, it will not hurt the others.

Seven kinds of mushrooms that are safe eating

Out of the many mushrooms that are *safe* we have pictured thirteen to help you to identify some of those you may find; and that you may make no mistake, we also show nine that are *extremely poisonous.* Note the difference between the fairy-ring (figure 6 of the edible varieties) mushroom that grows in the open and its wicked counterpart (figure 2 of the poisonous) which slinks in the shade as if afraid to come to the light. *And be sure not to confuse number 8 (edible) with the most deadly of all poisonous mushrooms, the lovely Amanita, with its*

Death-cup hidden beneath the ground's surface (figure 6, poisonous). LOOK FOR THAT CUP, *always!*

Besides the pictures we shall describe six or seven, and after studying the illustrations and text you can gather a good meal outdoors.

The *meadow* mushroom is the best known and most widely found. It is smooth or slightly rough, according to its age, and is creamy white or tawny. The color of its gills is most important. If we break away the veil in an unopened specimen we find them pallid pink. As the growth advances they become decidedly pinkish, changing to brownish black, and they are of unequal lengths. The stem is creamy white and solid, and *always* shows the remains of the veil in a frill or ring under the cap.

The *pasture* mushroom is egg-shaped, expanding into a parasol sometimes seven inches across, with the apex raised in a marked degree. It is pale buff, spotted with shaggy patches; gills at first almost white, crowded, finally becoming like the cap in color. The stem is tall, slender, streaked and speckled with brown, encircled with a loose ring, hollow and growing from a fibrous bulb, having no sign of the fatal cup that is a never failing sign of POISON. This mushroom has been called the nut mushroom on account of its flavor, and dries naturally while standing in the pastures. It is also fragrant.

Puffballs are edible, although joyous school children usually think they are made to kick or to pinch so as to make the smoke fly. Yet, in their *white stage* they make very good eating, but be sure that you are not picking the deadly *"cup" sort*, for, in its earlier stages, that dangerous mushroom is apt to look like the innocent puffball. But, remember, the one is *below ground*, while puffballs are above. Once warned, twice armed! Be sure to open each specimen and be sure to look for the cup before giving your treasures to be cooked.

Green is a rare color among mushrooms, but that of the *green Russula* is not the bright green of grass: rather it is a metallic or grayish green. These mushrooms are found in hard wood groves or their edges and are as sweet as a chestnut. Their cap is slightly hollow, and becomes broken at the fluted edge of the gills. The creamy white of the gills has the appearance of network; they are thick, very brittle and of equal length. The stem is solid and creamy white. This sort also has purple and reddish caps (fig. 10, edible).

When, in late September, you come upon what seems a strange nest of goose eggs, their summits spotted with brown, you may know you have found another "safe" mushroom. Nothing else looks like them. As this sort grows in dense masses you can get a whole dinner for the family right there. These mushrooms are called *shaggy-manes* because of a fancied resemblance to a wig, and should be gathered while the concealed, crowded and equal-lengthed gills are either white or pink, otherwise they are unwholesome, and they finally melt away into an inky mass.

The *edible tube* mushroom has a cushionlike, moist cap which is light brown or darkish red. The surface of the cap is dull and smooth as a kid glove, and the stout stem is a pale brown, generally with a fine raised network of pink lines near the cap. The flesh of the light brown ones is white or yellowish, *not changing color when broken.* When young they are peculiarly nutty to the taste. They can be found in the months of July and August.

One dark red variety closely resembles beefsteak, in color, general appearance and flavor. This mushroom can never be mistaken, as it grows with its very short stem on stumps and trunks of oak or chestnut. One has been found weighing thirty pounds, and provided a hearty meal for several men after it was sliced in sections and broiled over live coals. The veins of darker red running through the pinky flesh of the under tube surface, combined with the clammy moistness of the dark red cap, make its name of beefsteak mushroom most apt.

Mushrooms will amply repay ardent study. Look, compare, assort, "photograph" their spores, be careful, and it will not be long before you can add to the family larder by your pleasant rambles through the fields and woods as well as to your fund of knowledge and personal happiness.

Get the illustrated bulletins issued by the Government, and choose first those *fungi* which it is impossible to confuse with any of the dangerous varieties.

THE NEXT NATURE STORY IS ON PAGE 4947.

Picking Cotton in a Southern Cotton Field.

HOW COTTON BECOMES CLOTH

CONTINUED FROM 4809

COTTON is the most valuable fibre in the world. Its uses are so many that we cannot begin to tell them all. We wear cotton clothing sewed with cotton thread, tie up cotton bags with cotton string, and are sheltered by cotton tents or awnings. We may sleep between cotton sheets, on a cotton mattress, under quilts padded with cotton. The doctor binds a cotton pad over a wound with a cotton bandage. You can think of dozens of other uses of this wonderful fibre.

The cotton plant grows in the warmer parts of the world, in North and South America, in Egypt, China, India, Australia, some parts of Asiatic Russia, and on many of the warmer islands of the world. Sometimes it is a plant, sometimes a shrub, and in some countries a small tree, which does not die when the cooler weather comes. There are many species, but only three or four are of any importance.

Though cotton is a native of the tropics, it produces best in temperate climates, which are not too cold or too dry. The southern part of the United States produces the most and also the finest cotton. India grows a great deal, but it is hard to spin, while Egypt grows a fine quality, but there is too little land in Egypt to grow very much. None of the other countries grow enough for their own use.

The plant as it grows in the United States is an annual, that is, it dies in the fall, and must be planted again in the spring. It is from two to six feet high, and belongs to the same family as the hollyhock. The flower is very much like that of the hollyhock, and is cream-colored when it opens, turns pink the next day, and drops off on the third. It leaves a tiny boll, which grows until it is about the size of a walnut. In it the fibre is tightly packed. When ripe the boll bursts open, and the snowy white fibre hangs out.

HOW COTTON IS PICKED FROM THE OPENED BOLLS

Men, women, and children, white and negro, go through the field pulling out this fibre. The fibre, however, clings tightly to the seeds, and must be separated before the cotton can be used. Before the invention of the cotton-gin by Eli Whitney, of which we tell you in another place, the fibre was separated by hand. This was such slow work that very little was grown. A cotton-gin could do the work of dozens of people, and the amount of cotton grown has increased very greatly. After it has been ginned, the cotton is packed into bales, which

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weigh about 500 pounds each, ready to be sent to the cotton mills, about which we shall tell you in a moment.

Formerly most of the seeds were thrown away, but it was found that they contain a very valuable oil. Now the hulls are taken off, and the seeds are pressed to remove the oil. Sometimes the seeds are cooked first. This oil is then refined, and probably you have eaten it with salad many times. It is much used in cooking, and is also used in making soap and paint. The meal from which the oil has been pressed is used as food for cattle, and in making fertilizer. The hulls also make good food for cattle.

WHY THE UNITED STATES BOTH SELLS AND BUYS COTTON

Though there are hundreds of cotton mills in the United States, they consume less than half of the cotton that is grown in the country. The remainder is sent to all parts of the world. Mills in Europe, Japan, and other countries use much American cotton. On the other hand, some from Egypt is brought to this country, for a special reason. If you have ever seen a tuft of cotton, you can see that it is a mass of tiny fibres tangled together. If these fibres are very short, only coarse yarn and cloth can be made from them, while fine yarn and thin cloth are made only from cotton with a long fibre. Now the fibre of Egyptian cotton is longer than that of most American cotton, and therefore some Egyptian cotton is brought across the ocean to be used in making knit underclothes and hose.

There is a kind of cotton grown in the United States which has a longer fibre than the Egyptian. It is called Sea Island cotton, but it will grow in only a few places, and so there is never enough of it. The fibres are very fine, soft, and long. Some of this cotton is used to mix with silk, and it has been found that it can be used to cover the wings of aeroplanes instead of linen, which is coming to be very scarce.

WHERE THE COTTON MILLS ARE TO BE FOUND

The cotton mills of the United States are not scattered over the whole country, as you will find. North Carolina has the most mills, but many of them are small. South Carolina also has many mills, but Massachusetts has the largest mills, and is the leading state in the industry. New Hampshire, Rhode Island, Georgia, and Alabama also have many mills, and there are some in other states.

The cotton must go through many machines before it becomes cloth. A cotton mill seems to be full of noise and glittering steel, and our pictures tell the story better than we could do in many pages of words. If you will study them, and the descriptions under them, you will begin to see how wonderful a piece of cloth is. The cotton is first twisted into threads, called yarn, and these are woven into cloth. The cotton must go through several machines before it becomes yarn, however, for the fibres must be straightened out, and laid beside one another.

HOW THE COLORS COME TO BE IN THE CLOTH

The colors in cloth may be produced in several different ways. Sometimes the cotton is dyed before it is spun, sometimes the yarn is dyed, and sometimes a pattern is printed on the cloth, like a picture on paper. Stripes are sometimes printed, and sometimes are made by using a few colored threads. Look on the back of the cloth and you can decide whether the stripe was woven or printed. On most printed cloth the color does not come through the cloth, or at least does not show clearly.

Every one of you has seen a spool of thread, such as your mother uses. This is made from many fibres of cotton twisted together, and then four, six or more of these are again twisted together to make the tiny thread you see. This will show you how fine each single fibre is. An ordinary thread is composed of hundreds of delicate fibres twisted together.

Not all the cotton used in the world is used in these great mills. In India much of what is grown there is spun on a simple wheel, and woven into cloth on hand looms very like those which were used hundreds of years ago. Some of these workmen can make finer cloth than can be done on machines. The muslins of India have been always famous. Many other countries use some of the cotton they grow in this way, but the cotton mills of the world use much more. Recently much cotton has been used in making some of the most powerful explosives, which are now used in warfare.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 4933.

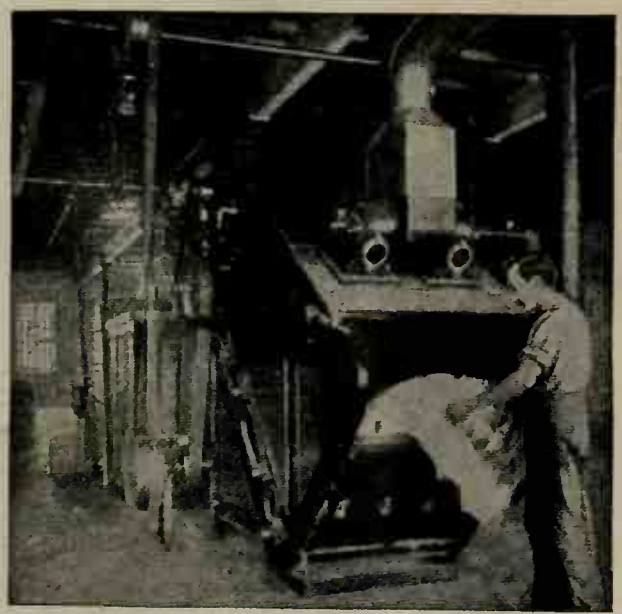
COTTON IN THE FIELD AND THE FACTORY

In the United States, which provides three-fourths of the world's cotton, there are millions of acres of land like that shown in the first picture, where negroes are picking cotton. Most of the cotton is still picked by hand. The fibre is then separated from the seeds by a gin, shown in the right-hand picture.

After being separated from the seeds, the cotton is packed into bales by powerful presses. These bales usually weigh about five hundred pounds each.

This is another view of a different press. The United States produces about 12,000,000 bales of cotton a year, weighing 6,000,000,000 pounds.

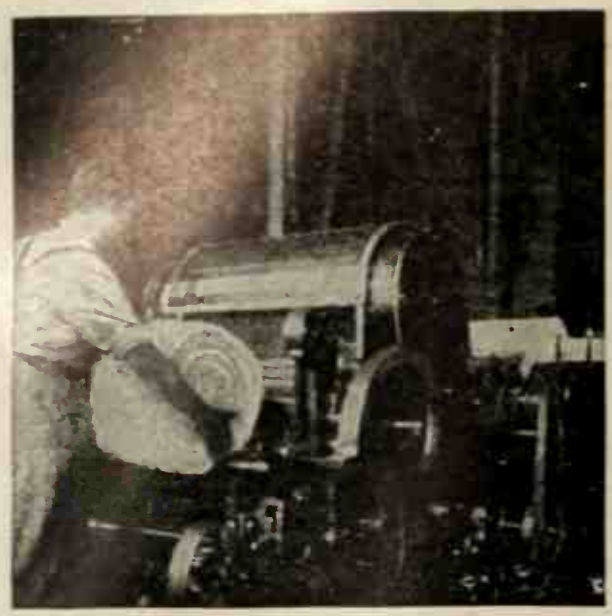
Millions of bales are shipped north, and to Europe. Here we see a bale of raw cotton that has just arrived from the South being hoisted into the mill.

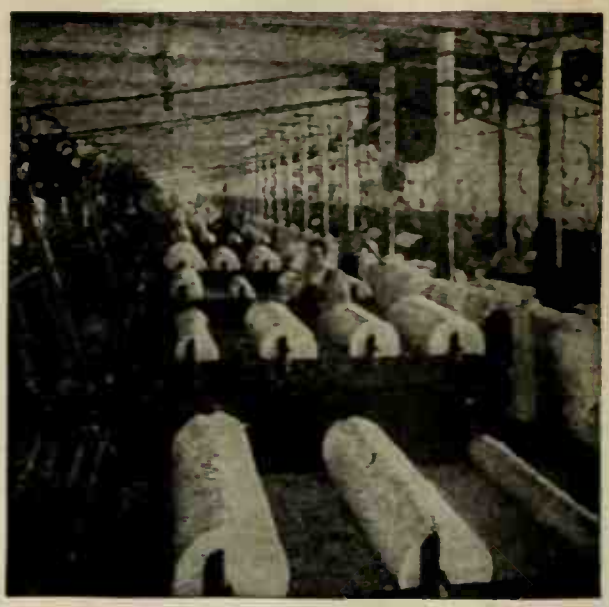


The bales are opened, and the raw cotton is first passed through the blowing-room, where a machine, known as an opener, tears it apart and cleans it.

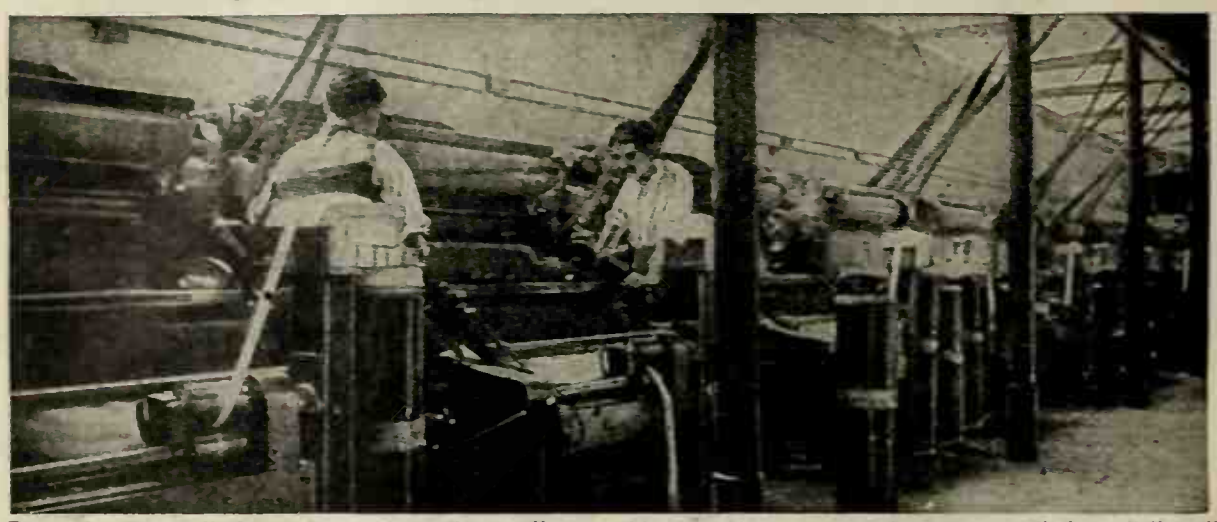
First picture copyright by B. L. Singley. Second, third and fourth pictures copyright by H. C. White Co.

WINDING THE COTTON ON TO BOBBINS

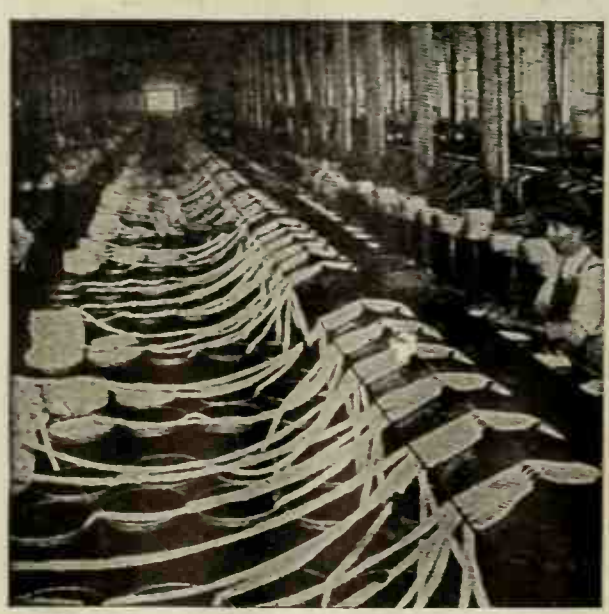




Here we see the cotton coming out of the opener, in which it has been cleaned and prepared for spinning. The cotton is then passed through a machine called a "scutcher," or a "lapper," and is further cleaned.



From the "lapper" the cotton goes to the carding-machine, coming out as a long rope, called a "sliver." This name comes from an Anglo-Saxon word meaning to cleave, or divide. Here we see carders at work.

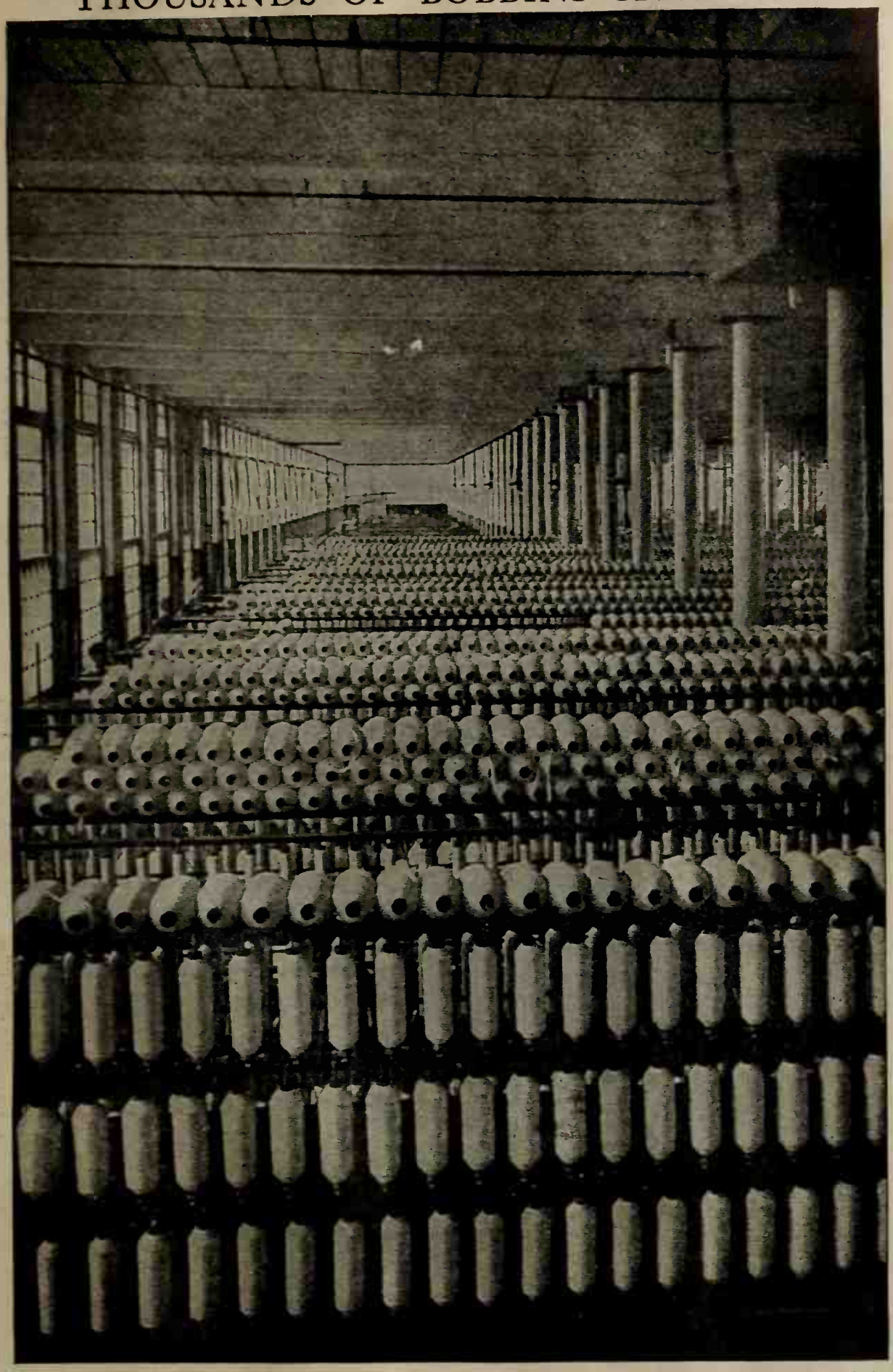


Several slivers are now put together and passed through the drawing-machine, which makes all the strands uniform in thickness and the fibres parallel.

The next process is "slubbing." The strands pass out of the cylinders in which they are coiled, go through the rollers, and are wound on to bobbins.

Second, fourth and fifth pictures copyright by H. C. White Co.

THOUSANDS OF BOBBINS SPINNING



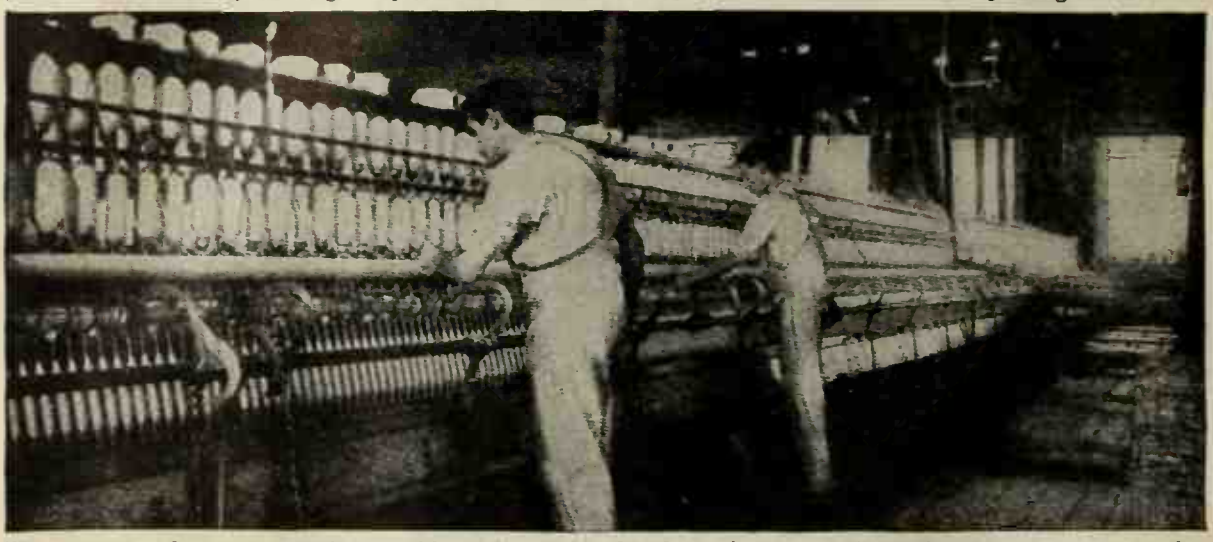
Here is one of the most marvelous sights to be seen in the modern world of work. Thousands of bobbins, wound round with the strands of cotton, are arranged on machines called speeders, which begin to twist the fibres into yarn. Many millions of yards of fibre are rolled and unrolled in this room.

Copyright by H. C. White Co.

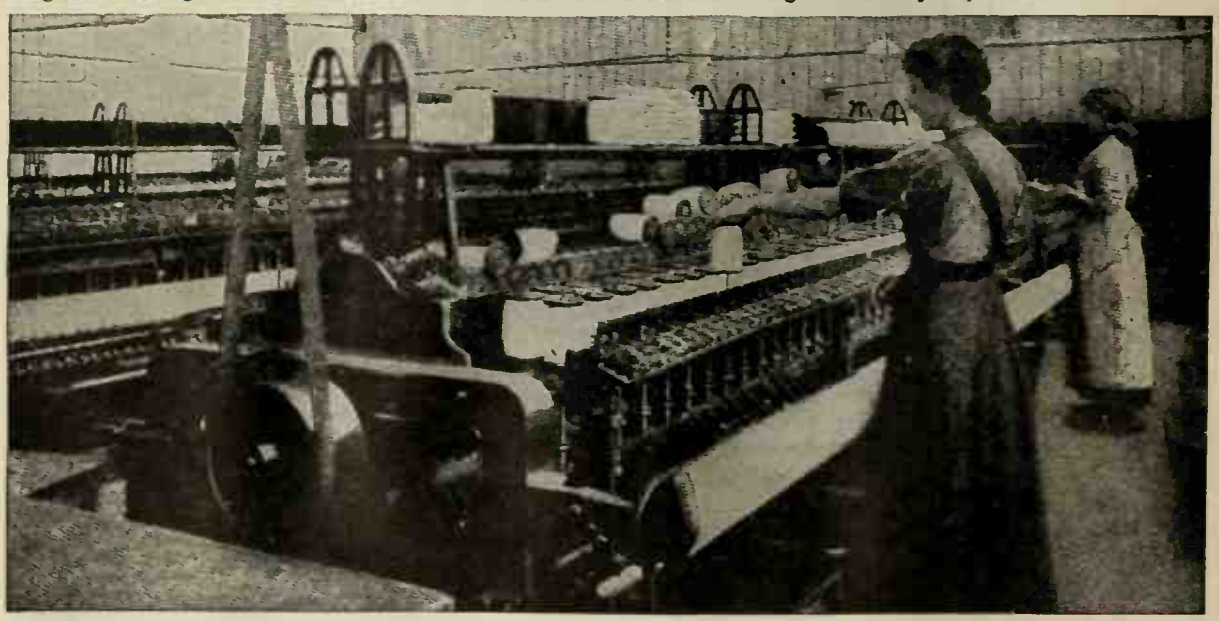
TWISTING THE FIBRE INTO THREAD

It is in slubbing that the cotton-fibre is given its first twist for the making of the yarn, and here we see the slubbers at work, winding the yarn on bobbins.

After other processes, the bobbins go to the spinning-frame. This elaborate contrivance is very different from the old-fashioned spinning-wheel.



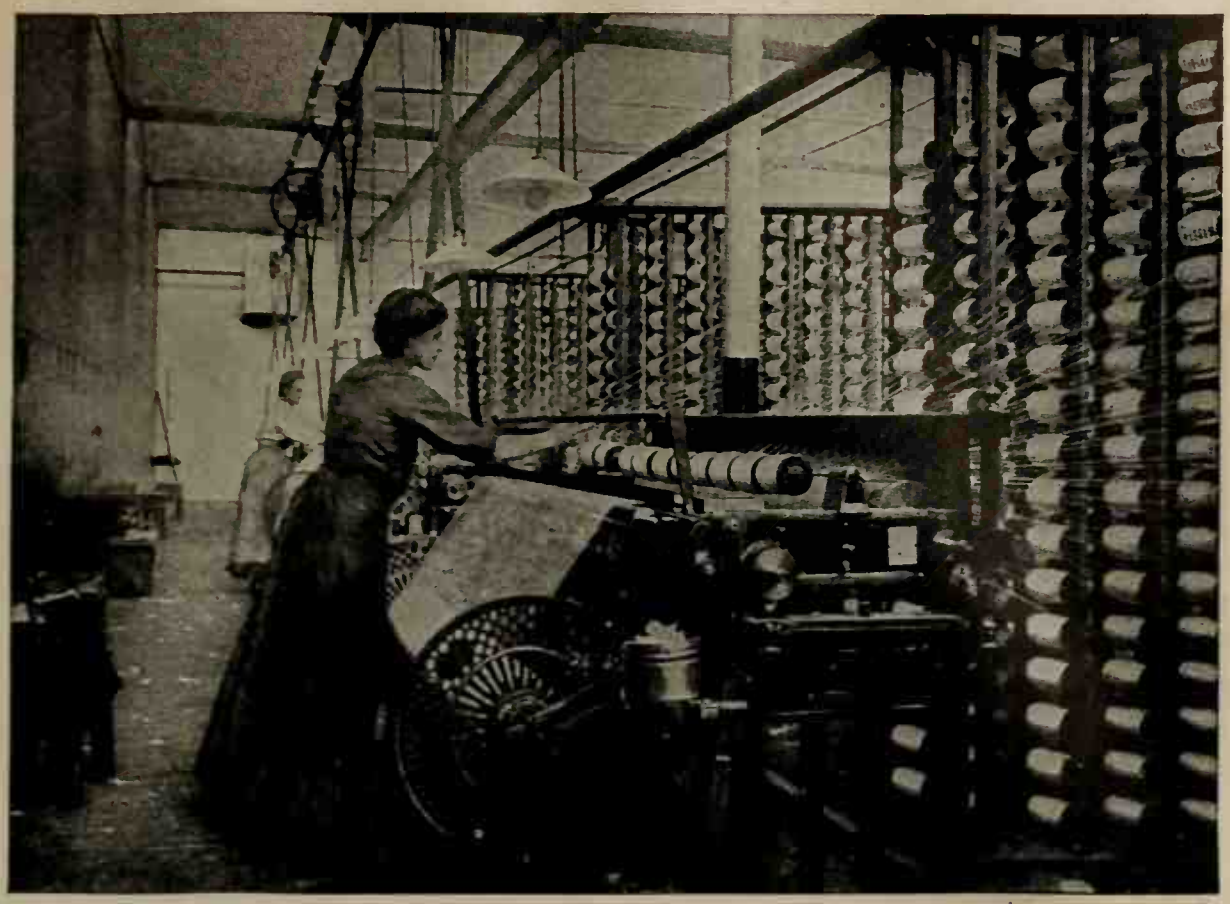
There are two kinds of spinning-machines, known as the ring spinner and the mule. Here we see a spinning-mule taking the strands from the bobbins at the back and twisting them into yarn, or thread.



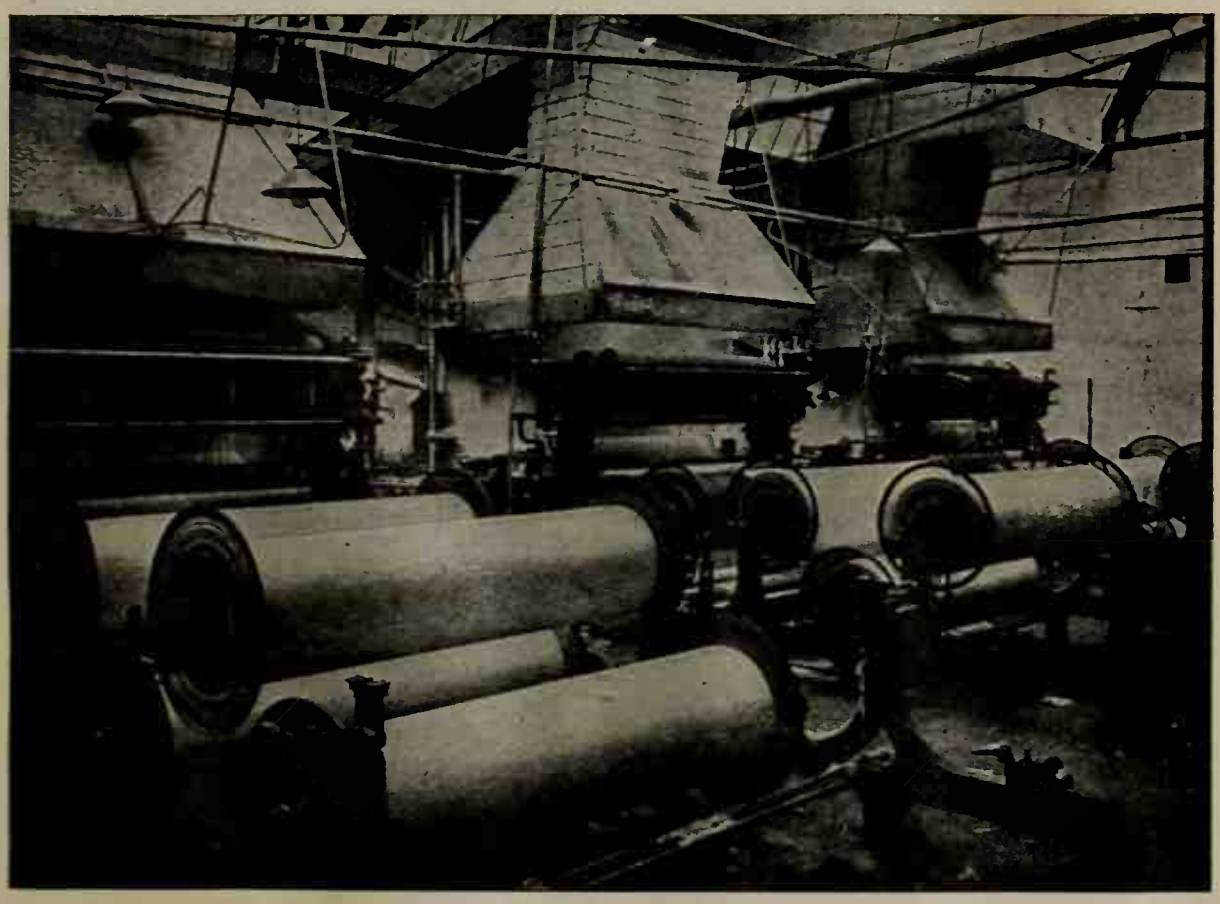
The thread, or yarn, is wound into spools, upon the spindles of the mule, and these spools, called cops, are taken by girls, who are known as winders, and the thread is wound upon bobbins by machinery.

First and second pictures copyright by H. C. White Co.

WINDING AND STRENGTHENING THREAD

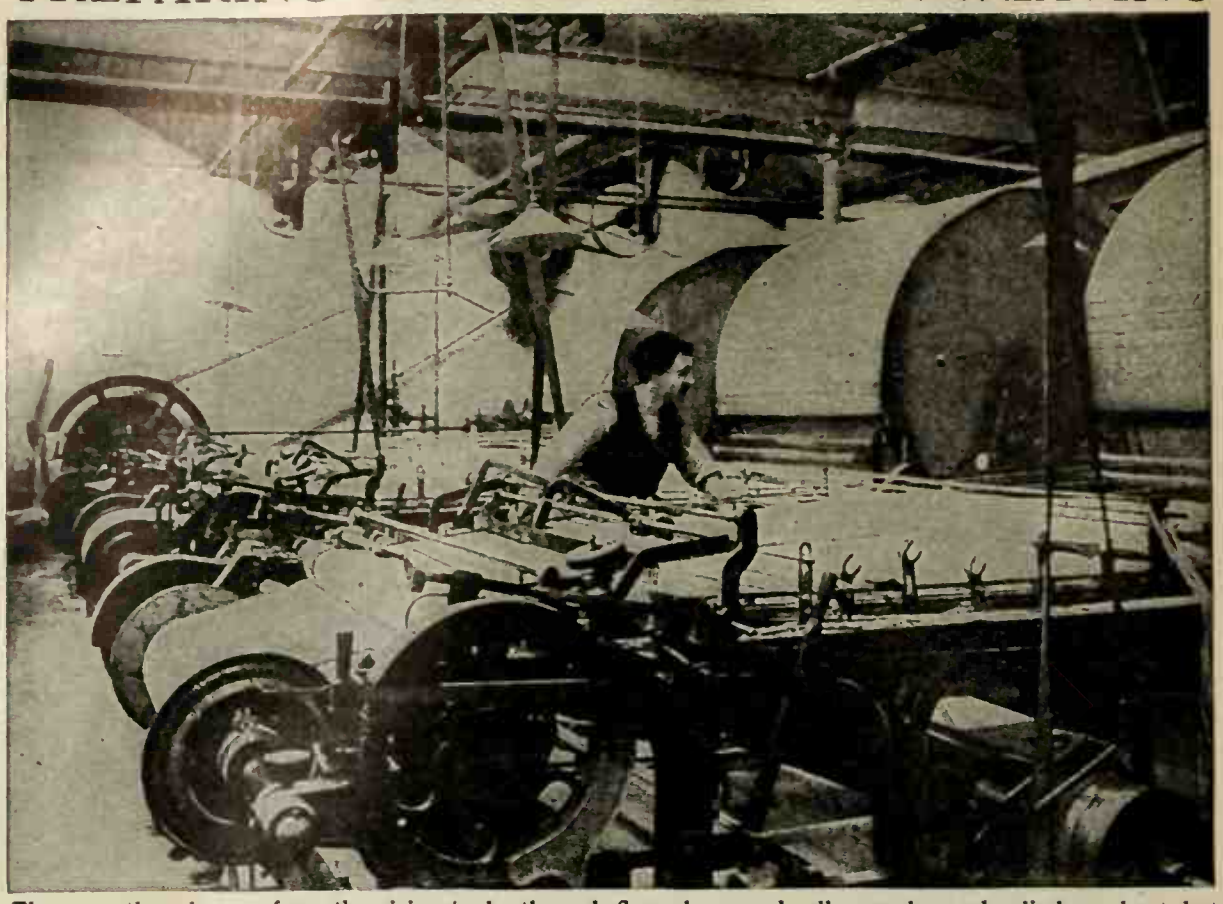


The bobbins of yarn are then arranged in frames called creels, and the threads are passed into the warping-machine. The machine takes all the threads and winds them side by side round a large roller, and this yarn forms the warp, or body of threads, into which the weft, or cross threads, are to be woven.

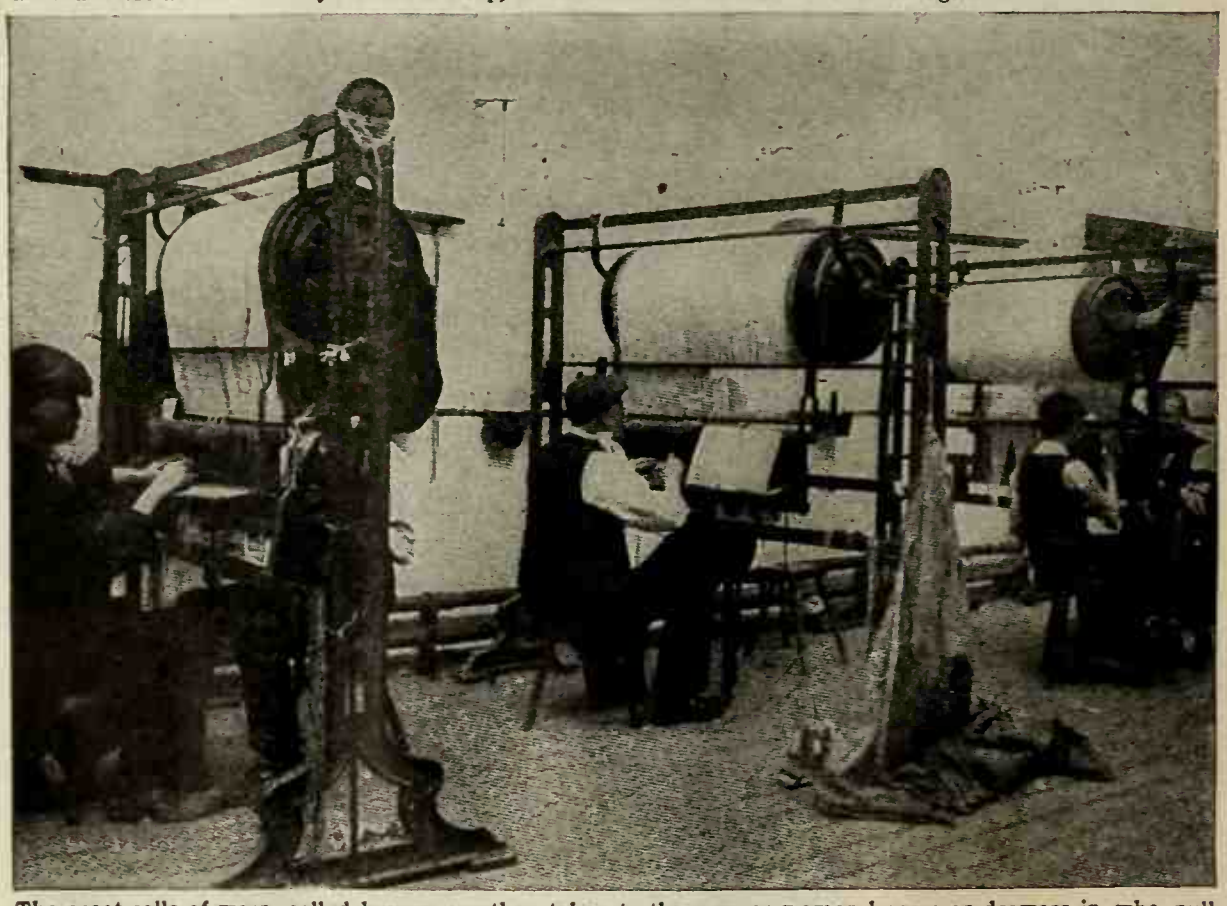


The cotton threads of the warp must next be sized, to make them hold firmly together and make them ready for weaving. The yarn on the rolls is run through tanks of hot size, and in the middle of this picture we can see the steam from the size-tank. Great skill is needed in drying the cotton after sizing.

PREPARING THE THREADS FOR WEAVING



The warp-threads pass from the sizing-tanks through flannel-covered rollers and round cylinders, kept hot by steam. These cylinders are on the right of this picture. Sometimes, instead of heated cylinders, hot-air chambers are used to dry the sized warp, which is then wound on to the roller again.



The great rolls of warp, called beams, are then taken to the men or women known as drawers-in. who pull down the threads, and pass the ends through the guiding apparatus, ready for the weaving-loom.

The photographs on these pages are by Mr. W. H. Knowles; Messrs. Underwood & Underwood, London; and the H. C. White Co.

WEAVING THE THREADS INTO CLOTH

A man called a tackler then takes charge of the beam, or roll of warp, and fixes it on the loom. His duty is to start the beam and keep the loom in order.

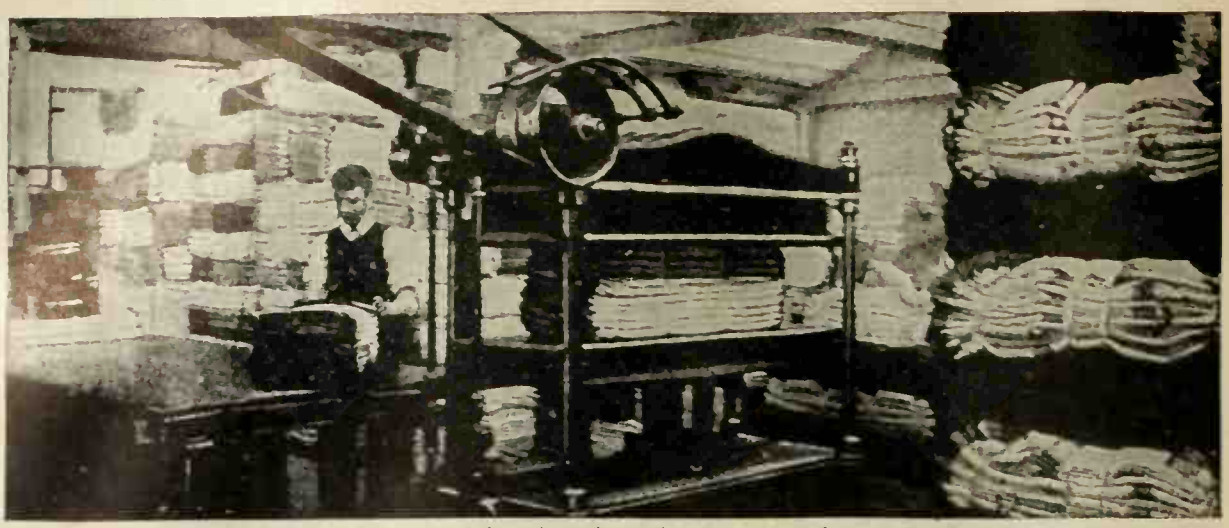
The cotton threads are now woven into one sheet by the loom. The weavers toil amid a terrific din, to which, however, they get accustomed.

As the cloth is woven, it is wound on to a roller in front of the loom. It is then removed and folded by machinery for despatch to all parts of the world.

Much of the woven cotton goods that is produced is printed with patterns in colors, and here we see the printing-room of a great weaving factory.

When the length of woven cloth is folded, as shown in the picture above, it is known as a "cut." Each cut is examined to see that it is perfectly woven and has no flaws. Here we see the inspectors at work.

A PIECE OF CLOTH READY FOR USE



After the "cuts" have been examined and found perfect, they are passed on to a presser, who places them in a machine, and presses the cloth tightly together, so that it may take up as little room as possible.

In some factories rolls of cloth are examined before folding. Here is a room in a factory, in which thousands of miles of cloth are inspected every year.

After examination, the cloth is folded ready tor pressing and packing, and girls now stitch the ends, to prevent the "cuts" from coming undone.

Here, at last, we see the finished cloth, that some time ago was growing in the cotton plantations, piled up in the warehouse ready for sale.

Third picture copyright by H. C. White Co.

In this last picture the cotton cloth is being placed on the railway for despatch to various ports, whence it may be taken to India and China and Africa.

ALL QUIET ALONG THE POTOMAC

BARBARA FRIETCHIE

JOHN G. WHITTIER, the famous Quaker poet of America, who loved to sing of the quiet things of life, could tune his note to the heroic with no uncertain strain, as we find in this inspiring poem. It tells a story of the terrible Civil War, when the Southern States fought against the North. Lee and Stonewall Jackson were Southern leaders. When General Lee invaded Maryland in September, 1862, it was reported that an old woman, Barbara Frietchie, nearly ninety-five years old, had waved a Union flag in defiance of the Confederate forces. The scene that followed is dramatically related in the poem. Though it is certain that no such incident occurred, the spirited poem has had a wide popularity. Mrs. Frietchie did wave a Union flag to welcome the Federal troops a few days later.

CONTINUED FROM 4778

UP from the meadows rich with corn,
Clear in the cool September morn,
The cluster'd spires of Frederick stand
Green-walled by the hills of Maryland.
Round about them orchards sweep,
Apple and peach-tree fruited deep,
Fair as the garden of the Lord
To the eyes of the famished rebel horde,
On that pleasant morn of the early fall,
When Lee marched over the mountain wall—
Over the mountains winding down,
Horse and foot, into Frederick Town.
Forty flags with their silver stars,
Forty flags with their crimson bars,
Flapped in the morning wind: the sun
Of noon look'd down, and saw not one.
Up rose old Barbara Frietchie then,
Bow'd with her four score years and ten;
Bravest of all in Frederick Town,
She took up the flag the men haul'd down;
In her attic window the staff she set,
To show that one heart was loyal yet.

Up the street came the rebel tread,
Stonewall Jackson riding ahead.
Under his slouched hat, left and right
He glanced: the old flag met his sight.
"Halt!"—the dust-brown ranks stood fast.
"Fire!"—out blazed the rifle-blast;
It shivered the window, pane, and sash,
It rent the banner with seam and gash.
Quick, as it fell from the broken staff,
Dame Barbara snatched the silken scarf,
She leaned far out on the window-sill
And shook it forth with a loyal will.
"Shoot, if you must, this old grey head,
But spare your country's flag!" she said.

A shade of sadness, a blush of shame,
Over the face of the leader came;
The nobler nature within him stirred
To life at that woman's deed and word.
"Who touches a hair of yon grey head
Dies like a dog! March on!" he said.

All day long through Frederick Street
Sounded the tread of marching feet;
All day long that free flag tossed
Over the heads of the rebel host.
Ever its torn folds rose and fell
On the loyal winds that loved it well;
And through the hill-gaps, sunset light
Shone over it with a warm good-night.
Barbara Frietchie's work is o'er,
And the rebel rides on his raids no more.
Honour to her!—and let a tear
Fall, for her sake, on Stonewall's bier.
Over Barbara Frietchie's grave
Flag of Freedom and Union wave!
Peace and order, and beauty draw
Round thy symbol of light and law;
And ever the stars above look down
On thy stars below in Frederick Town!

THE SEA

The spirit of freedom which one seems to absorb when in the full delight of a voyage over the sparkling sea has never been better rendered than in this poem by Barry Cornwall, whose real name was Proctor. In this case it is supposed to be an old sailor who is speaking, but the salty breeze, which the poet has so cleverly suggested by the swift movement of his verse, is familiar to us all. There is a certain infectious quality of actual pleasure in this song of the sea that makes us for the moment sharers of the old sailor's love for the life of the ocean, though we may be conscious that there is another side to it less attractive.

THE Sea! the Sea! the open Sea!
The blue, the fresh, the ever free!
Without a mark, without a bound,
It runneth the earth's wide regions 'round;
It plays with the clouds, it mocks the skies,
Or like a cradled creature lies.

I'm on the Sea! I'm on the Sea!
I am where I would ever be—
With the blue above, and the blue below,
And silence wheresoe'er I go.
If a storm should come and awake the deep,
What matter? I shall ride and sleep.

I love—oh, *how* I love—to ride
On the fierce, foaming, bursting tide,
When every mad wave drowns the moon,
Or whistles aloft his tempest-tune;
And tells how goeth the world below,
And why the south-west blasts do blow.

I never was on the dull, tame shore
But I loved the great Sea more and more,
And backwards flew to her billowy breast,
Like a bird that seeketh its mother's nest;
And a mother she *was*, and *is* to me,
For I was born on the open Sea.

The waves were white, and red the morn,
In the noisy hour when I was born;
And the whale it whistled, the porpoise rolled,
And the dolphins bared their backs of gold;
And never was heard such an outcry wild
As welcomed to life the Ocean-child.

I've lived since then, in calm and strife,
Full fifty summers a sailor's life,
With wealth to spend, and a power to range,
But never have sought nor sighed for change;
And Death, whenever he come to me,
Shall come on the wide, unbounded Sea.

ALEXANDER SELKIRK

William Cowper, the famous English poet, has endeavored in this poem to suggest thoughts that might have arisen in the mind of Alexander Selkirk as he stood on the highest point of his lonely island and surveyed the scene on which his fate had cast him. For Alexander Selkirk was the shipwrecked mariner whose adventures on an island of the Pacific suggested to Daniel Defoe the immortal story of "Robinson Crusoe."

I AM monarch of all I survey;
My right there is none to dispute;
From the centre all round to the sea
I am lord of the fowl and the brute.
O Solitude, where are the charms
That sages have seen in thy face?
Better dwell in the midst of alarms
Than reign in this horrible place.

I am out of humanity's reach;
I must finish my journey alone;
Never hear the sweet music of speech—
I start at the sound of my own.
The beasts that roam over the plain
My form with indifference see;
They are so unacquainted with men,
Their tameness is shocking to me.

Society, friendship, and love,
Divinely bestowed upon men,
O, had I the wings of a dove,
How soon would I taste you again!
My sorrows I then might assuage
In the ways of religion and truth;
Might learn from the wisdom of age,
And be cheer'd by the sallies of youth.

Religion! what treasure untold
Resides in that heavenly word!
More precious than silver and gold,
Or all that this earth can afford.
But the sound of the church-going bell
These valleys and rocks never heard—
Never sigh'd at the sound of a knell,
Or smiled when a Sabbath appear'd.

Ye winds that have made me your sport,
Convey to this desolate shore
Some cordial endearing report
Of a land I shall visit no more.
My friends, do they now and then send
A wish or a thought after me?
O, tell me I yet have a friend,
Though a friend I am never to see.

How fleet is the glance of the mind!
Compared with the speed of its flight,
The tempest itself lags behind,
And the swift winged arrows of light.
When I think of my own native land,
In a moment I seem to be there;
But, alas! recollection at hand
Soon hurries me back to despair.

But the sea-fowl is gone to her nest,
The beast is laid down in his lair;
Even here is a season of rest,
And I to my cabin repair.
There's mercy in every place;
And mercy—encouraging thought—
Gives even affliction a grace,
And reconciles man to his lot.

ETERNAL FATHER, STRONG TO SAVE

It is often said that many of the hymns used in our churches are deficient in literary quality; poor examples of verse, though their piety may be unquestioned. That charge cannot be made against the following well-known hymn, written by W. Whiting in 1860. It might best be described as a prayer in verse, and the words are not unworthy of the thoughts.

ETERNAL Father, strong to save,
Whose arm hath bound the restless wave,
Who bidst the mighty ocean deep
Its own appointed limits keep;
O, hear us when we cry to Thee
For those in peril on the sea!

O Christ, whose voice the waters heard,
And hushed their raging at Thy word,
Who walkedst on the foaming deep,
And calm amid the storm didst sleep;
O, hear us when we cry to Thee
For those in peril on the sea!

Most Holy Spirit, who didst brood
Upon the chaos dark and rude,
And bid its angry tumult cease,
And give, for wild confusion, peace;
O, hear us when we cry to Thee
For those in peril on the sea!

O Trinity of love and power,
Our brethren shield in danger's hour
From rock and tempest, fire and foe,
Protect them wheresoe'er they go;
Thus evermore shall rise to Thee
Glad hymns of praise from land and sea.

THE FERN AND THE MOSS

This little poem by Eliza Cook is really a lesson in plant life. Many instances could be given of what might be called the friendship of the plants, for it is not only the moss and the fern that are of use to each other. But the poet has chosen the best illustration for her purpose, and succeeds admirably in showing us that even the lowly forms of life may teach us a lesson in mutual helpfulness.

THERE was a fern on the mountain, and moss on the moor;
And the ferns were the rich, and the mosses the poor.
And the glad breeze blew gaily, from heaven it came,
And the fragrance it shed over each was the same;
And the warm sun shone brightly, and gilded the fern,
And smiled on the lowly-born moss in its turn:
And the cool dews of night on the mountain fern fell,
And they glistened upon the green mosses as well.
And the fern loved the mountain, the moss loved the moor,
For the ferns were the rich, and the mosses the poor.

But the keen blast blew bleakly, the sun waxed high,
And the ferns they were broken, and withered, and dry;
And the moss on the moorland grew faded and pale,
And the fern and the moss shrank alike from the gale.
So the fern on the mountain, the moss on the moor,
Were withered and black where they flourished before.

Then the fern and the mosses they grew wiser in grief,
And each turned to the other for rest and relief;
And they planned that wherever the fern-roots should grow,
There surely the moss should be sparkling below.

And the keen blasts blew bleakly, the sun waxed fierce;
But no wind and no sun to their cool roots could pierce;
For the fern threw her shadow the green moss upon,
Where the dew ever sparkled undried by the sun;
When the graceful fern trembled before the keen blast,
The moss guarded her roots till the storm-wind had passed;
So no longer the wind parched the roots of the one,
And the other was safe from the rays of the sun.

And thus, and for ever, where'er the ferns grow,
There surely the mosses lie sparkling below;
And thus they both flourish, where naught grew before,
And they both deck the woodland, and mountain, and moor.

MISS POPPY

We have already been able to include in our BOOK OF POETRY a number of pretty little lyrics by Mr. Frederic E. Weatherley, the well-known song-writer, and it is by his permission that this little song of the poppy is given here.

'TWAS on a summer morning,
Walking through the corn,
That I met a little maid
Looking all forlorn.

She had a scarlet petticoat,
So beautiful to see;
I wondered if this little maid
Would ever marry me.

I bowed to her, I spoke to her,
I gave her sweet good-day;
She only tossed her little head,
And turned the other way.

But oh, I loved her dearly,
And grew so very bold,
I took her hand, I kissed her lips,
Although they were so cold.

I took her in my loving arms,
And carried her away,
I said maybe she'll look on me,
And marry me next day.

But when I came next morning,
I found her dead, ah me!
She was only a scarlet poppy
That had grown beside the sea.

ALL THINGS BRIGHT AND BEAUTIFUL

There is no lack of children's hymns, though there are not a great many that have at once the merit of being suitable for singing in church or for reading as a little poem at home. But among the few with this double quality this hymn by the late Mrs. Alexander, whose "Once in Royal David's City" we have read on page 2190, takes high rank, by reason of its unstrained beauty and simplicity of thought and expression.

ALL things bright and beautiful,
All creatures great and small,
All things wise and wonderful,
The Lord God made them all.

Each little flower that opens,
Each little bird that sings,
He made their glowing colours,
He made their tiny wings.

The rich man in his castle,
The poor man at his gate,
God made them, high or lowly,
And order'd their estate.

The purple-headed mountain,
The river running by,
The sunset and the morning,
That brightens up the sky—

The cold wind in the winter,
The pleasant summer sun,
The ripe fruits in the garden—
He made them every one;

The tall trees in the greenwood,
The meadows where we play,
The rushes by the water,
We gather every day.

He gave us eyes to see them,
And lips that we might tell
How great is God Almighty,
Who has made all things well.

RECESSIONAL

Mr. Rudyard Kipling would rank high among English poets if he had written nothing but this great poem. The title "Recessional" indicates, in a poetic way, the occasion of its writing. In the year 1897 England saw the gorgeous celebration of Queen Victoria's Diamond Jubilee, when from the remotest parts of the British Empire came the representatives of Britain's power, to take part in the triumphal procession through the streets of London, and a great naval review provided an imposing display of her strength upon the seas. Mr. Kipling published this "Recessional"—as the hymn sung when the congregation is leaving church is termed—to remind the English people that all they held was in the hands of God. It ranks easily among the great poems of the last century.

GOD of our fathers, known of old,
Lord of our far-flung battle-line,
Beneath whose awful Hand we hold
Dominion over palm and pine—
Lord God of Hosts, be with us yet,
Lest we forget—lest we forget.

The tumult and the shouting dies;
The captains and the kings depart:
Still stands Thine ancient sacrifice,
An humble and a contrite heart.
Lord God of Hosts, be with us yet,
Lest we forget—lest we forget.

Far called, our navies melt away;
On dune and headland sinks the fire:
Lo, all our pomp of yesterday
Is one with Nineveh and Tyre.
Judge of the Nations, spare us yet,
Lest we forget—lest we forget.

If, drunk with sight of power, we loose
Wild tongues that have not Thee in awe,
Such boastings as the Gentiles use,
Or lesser breeds without the Law—
Lord God of Hosts, be with us yet,
Lest we forget—lest we forget.

For heathen heart that puts her trust
In reeking tube and iron shard,
All valiant dust that builds on dust,
And guarding, calls not Thee to guard,
For frantic boast and foolish word—
Thy mercy on Thy people, Lord. Amen.

WHILE WE MAY

Some fine poems have been written by anonymous authors. "While We May" is one of these, and is well worth reading.

THE hands are such dear hands;
They are so full; they turn at our demands
So often; they reach out
With trifles scarcely thought about
So many times; they do
So many things for me, for you—
If their fond wills mistake,
We may well bend, not break.

They are such fond, frail lips
That speak to us. Pray if love strips
Them of discretion many times,
Or if they speak too slow or quick; such crimes
We may pass by, for we may see
Days not far off when those small words may be
Held not as slow, or quick, or out of place, but dear,
Because the lips are no more here.

They are such dear, familiar feet, that go
Along the path with ours, feet fast or slow,
And trying to keep pace; if they mistake
Or tread upon some flower that we would take
Upon our breast, or bruise some reed,
Or crush poor Hope until it bleed,
We may be mute,
Nor turning quickly to impute
Grave fault; for they and we
Have such a little way to go, can be
Together such a little while along the way,
We will be patient while we may.

So many little faults we find—
We see them—for not blind
Is love. We see them, but if you and I
Perhaps remember them some by and by
They will not be
Faults then, grave faults, to you and me,
But just odd ways, mistakes, or even less—
Remembrances to bless.
Days change so many things—yes, hours;
We see so differently in suns and showers.
Mistaken words to-night
May be so cherished by to-morrow's light,
We may be patient, for we know
There's such a little way to go.

LOVE AND FRIENDSHIP

We can always tell a song written by Thomas Moore, the famous Irish poet, as the melody seems peculiar to his verse.

"A TEMPLE to friendship," said Laura, enchanted,
"I'll build in this garden—the thought is divine."
Her temple was built, and she now only wanted
An image of friendship to place on the shrine.
She flew to a sculptor, who set down before her
A friendship, the fairest his heart could invent;
But so cold and so dull that the youthful adorer
Saw plainly this was not the idol she meant.

"Oh, never," she cried, "could I think of enshrining
An image whose looks are so joyless and dim;
But yon little god, upon roses reclining,
We'll make, if you please, sir, a friendship of him."
So the bargain was struck; with the little god laden
She joyfully flew to her shrine in the grove:
"Farewell," said the sculptor, "you're not the first maiden
Who came but for friendship and took away love."

OMISSION

The author of these lines, Margaret E. Sangster, has written story-books for young people and several volumes of verse. "Omission" conveys an important lesson to us all.

IT is not the thing you do, dear,
'Tis the thing you leave undone
Which gives you a bitter heartache
At the setting of the sun.
The tender word forgotten,
The letter you did not write,
The flower you might have sent, dear,
Are your haunting ghosts to-night.

THANKSGIVING DAY

This pretty little poem, which has been set to music, was written by Mrs. Lydia Maria Child, a noted abolitionist.

OVER the river and through the wood,
To grandfather's house we go;
The horse knows the way
To carry the sleigh
Through the white and drifted snow.

Over the river and through the wood—
Oh, how the wind does blow!
It stings the toes
And bites the nose,
As over the ground we go.

Over the river and through the wood,
To have a first-rate play;
Hear the bells ring
"Ting-a-ling-ding!"
Hurrah for Thanksgiving Day!

Over the river and through the wood,
Trot fast, my dapple-gray!
Spring over the ground,
Like a hunting hound!
For this is Thanksgiving Day.

Over the river and through the wood,
And straight through the barn-yard gate,
We seem to go
Extremely slow—
It is so hard to wait!

Over the river and through the wood—
Now grandmother's cap I spy!
Hurrah for the fun!
Is the pudding done?
Hurrah for the pumpkin pie!

UNDER THE GREENWOOD TREE

UNDER the greenwood tree
Who loves to lie with me,
And turn his merry note
Unto the sweet bird's throat—
Come hither, come hither, come hither,
Here shall he see
No enemy
But winter and rough weather.

WILLIAM SHAKESPEARE.

THE LAUGHING BROOK

There is a pleasant sense of brightness and sparkle in this unpretentious little poem by an American writer named Elizabeth Scantlebury, who knows how to write verse for little folk.

"WHY do you laugh, little brook, little brook,
And why so dimpled and gay?
What did you hear as you came through the wood,
And what did you see on the way?"

"Such fun as I've had! I saw in the wood
The violets opening their eyes,
The little ferns straightening out their curls,
And Jack-in-the-pulpit rise.

"The sunbeams, in passing, threw me a kiss;
The breezes whispered to me;
And the tiny pebbles tickled me so
I couldn't help laughing, you see."

BLESSED ARE THEY THAT MOURN

William Cullen Bryant, an American poet, seeks in these verses to give poetic expression to one of the sayings of Jesus. "Blessed are they that mourn, for they shall be comforted." Nothing that man can write can make the words of Jesus appear more wonderful, but these verses are very beautiful, and full of comfort and hope to those that are sad.

OH, deem not they are blest alone
Whose lives a peaceful tenor keep;
The Power who pities man has shown
A blessing for the eyes that weep.

There is a day of sunny rest
For every dark and troubled night;
And grief may bide, an evening guest,
But joy shall come with early light.

For God has marked each sorrowing day,
And numbered every secret tear,
And heaven's long age of bliss shall pay
For all His children suffer here.

O MAMMY'S PICKANINNY

This pretty little poem by Mrs. Lilla T. Elder will appeal to the little folks, whether of the North or of the South.

DEY say dat in de winter in de norf it mostly snows,
De skies am black an' dark, an' a-roarin col' wind blows.
Ef you wuz dar, ma honey, you would freeze dose little toes,
An' you couldn't look about yer widout mufflin' up yer nose,
O mammy's pickaninny.

Heah de roses bloom aroun' us an' de yaller jasmine grows,
De gret big sun's a-shinin' as de corn stands in rows—
O, wat's good fer coloured poor folks de Lord in heaben knows,
So keep right on, ma honey, kickin' up dose little toes,
O mammy's pickaninny.

TO THE FRINGED GENTIAN

William Cullen Bryant's poem to the waterfowl will be found elsewhere in this book. It and the Fringed Gentian, which is here given, are almost unexcelled as nature poems.

THOU blossom, bright with autumn dew,
And coloured with the heaven's own blue,
That openest when the quiet light
Succeeds the keen and frosty night;

Thou comest not when violets lean
O'er wandering brooks and springs unseen,
Or columbines in purple dressed,
Nod o'er the ground-bird's hidden nest.

Thou waitest late, and com'st alone,
When woods are bare, and birds are flown,
And frosts and shortening days portend
The aged year is near his end.

Then doth thy sweet and quiet eye
Look through its fringes to the sky,
Blue—blue—as if that sky let fall
A flower from its cerulean wall.

I would that thus, when I shall see
The hour of death draw near to me,
Hope, blossoming within my heart,
May look to heaven as I depart.

LITTLE VERSES FOR VERY LITTLE PEOPLE

ROBIN HOOD, Robin Hood,
Is in the little wood.
Little John, Little John,
He to the town is gone.

Robin Hood, Robin Hood,
Is telling his beads,
All in the green wood,
Among the green weeds.

Little John, Little John,
If he comes no more,
Robin Hood, Robin Hood,
He will fret full sore.

OLD King Cole was a merry old soul,
And a merry old soul was he;
He called for his pipe, and he called for his bowl,
And he called for his fiddlers three.

For every fine fiddler had a fine fiddle,
And a very fine fiddle had he;
So old King Cole was a merry old soul,
And a merry old soul was he;
He called for his pipe, and he called for his bowl,
And he called for his fiddlers three.

IF the old woman who lived in a shoe
Had lived in a cottage instead,
Her children could have played at hide-and-seek,
And needn't have been sent to bed.

If little Bo-peep hadn't lost her sheep,
She wouldn't have had to find them.
If Little Boy Blue had not any sheep,
He wouldn't have had to mind them.

If the goose that laid the golden eggs
Had not been killed that day,
She'd still be laying golden eggs
As hard as she could lay.

In fact, if we could manage things,
How different they would be!
But as we can't we'll let them stay
Just as they are, you see.

I OFTEN sit and wish that I
Could be a kite up in the sky,
And ride upon the breeze, and go
Whatever way it chanced to blow;
Then I could look beyond the town,
And see the river winding down,
And follow all the ships that sail,
Like me, before the merry gale,
Until at last with them I came
To some place with a foreign name.

"WHY is Pussy in bed?"
"She is sick," says the fly.
"And I fear she will die;
And that's why she's in bed."

"Pray what's her disorder?"
"A lock'd-jaw is come on,"
Said the fine downy swan;
"And that's her disorder."

"Who makes her nice gruel?"
"That she might not get worse,
Dog Tray is her nurse,
And makes her nice gruel."

"Pray who is her doctor?"
"I," said famed Mister Punch,
"At my back a great hunch;
But I am her doctor."

"Who thinks she'll recover?"
"I do, sir," said the deer,
"And I thought so last year;
I think she'll recover."

And when Puss is quite well,
All shall have noble fare;
Beasts, and fowls of the air,
And we'll ring the great bell.

OLD KING COLE

INTRO.

f

Old King Cole was a mer-ry old soul, And a mer-ry old soul was he; He call'd for his pipe, and he call'd for his bowl, And he call'd for his fidd-lers three. For ev-'ry fine fidd-ler had a fine fidd-le, And a ve-ry fine fidd-le had he; *ff* So old King Cole was a mer-ry old soul, And a mer-ry old soul was he; He call'd for his pipe, and he call'd for his bowl, And he call'd for his fidd-lers three.

THERE'S NOTHING LIKE A DADDIE

I do not want a puppy-dog, although I know tney're nice,
For my papa can romp with me in ways that quite suffice,
He'll bark just like a St. Bernard, and like a mastiff growl,
And you would feel like laughing when he imitates its howl.

I do not want a pussy-cat. I like cats pretty well,
But daddie beats them all, and plays better than I can tell.
He'll purr and siss like anything; his mewing you should hear;
It makes more noise than any cat. and, oh, I shake with fear!

I do not want a pony small. Of course they're lots of fun,
But what's the use of ponies when you're my dear daddie's son?
He takes me on his shoulders broad, or puts me on his knees,
And sets me off a-galloping as madly as you please.

In short, I don't want anything as long as daddie's here.
He's pretty much of everything, and don't get out of gear.
And best of all the things boys have, I'm sure you'll find it true,
There's nothing like a daddie who will always play with you!